APPENDIX B

EAST PIONEER MOUNTAIN WETLAND/CHANNEL RESTORATION AND MITIGATION PLAN VERSION 2

Yellowstone Mountain Club
Big Sky, Montana

Prepared for:

YELLOWSTONE MOUNTAIN CLUB
P.O. Box 161097
Big Sky, Montana 59716

Prepared by:

LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, Montana 59807

June 11, 2004

Project No: 140347.08A

LAND & WATER CONSULTING, INC.
1120 Cedar Street • P.O. Box 8254 • Missoula, Montana 59807 • Tel (406) 721-0354
E-mail info@landandwater.net • Fax (406) 721-0355

TABLE OF CONTENTS

TABLES, FIGURES and APPENDICES

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This restoration and mitigation plan is Appendix B to the Consent Decree. The locations described in this plan were selected in negotiations between the United States and YMC and other entities in which YMC admitted no liability and maintained its position regarding the jurisdictional status of alleged waters of the United States. Nothing in this document, including description of areas as "restoration" or "mitigation," constitutes a conclusion regarding the jurisdictional status of any location. No part of this document constitutes an admission of liability by YMC.

This plan outlines tasks and schedules for restoration and mitigation activities at East Pioneer Mountain, Yellowstone Mountain Club (**Figure 1**). Both wetlands and non-wetland channels are included in the plan. Wetlands/channels on East Pioneer Mountain have been delineated and summarized in a separate report titled *East Pioneer Mountain 2002 Supplemental Wetland Evaluation* (Land & Water Consulting 2003a). Another report titled *East Pioneer Mountain Areas of Concern* ("AOC") identifies sites with potential wetland impacts (Land & Water Consulting 2003b). This plan addresses AOC sites where restoration activities will occur and mitigation sites where additional wetland will be restored or created.

The plan identifies the general restoration/mitigation activities that will be used on all sites including topographic adjustments, construction features, vegetation plantings and erosion control provisions. Site-specific details are also provided for each restoration and mitigation site. Success criteria, contingency plans, reporting and implementation schedules are also provided.

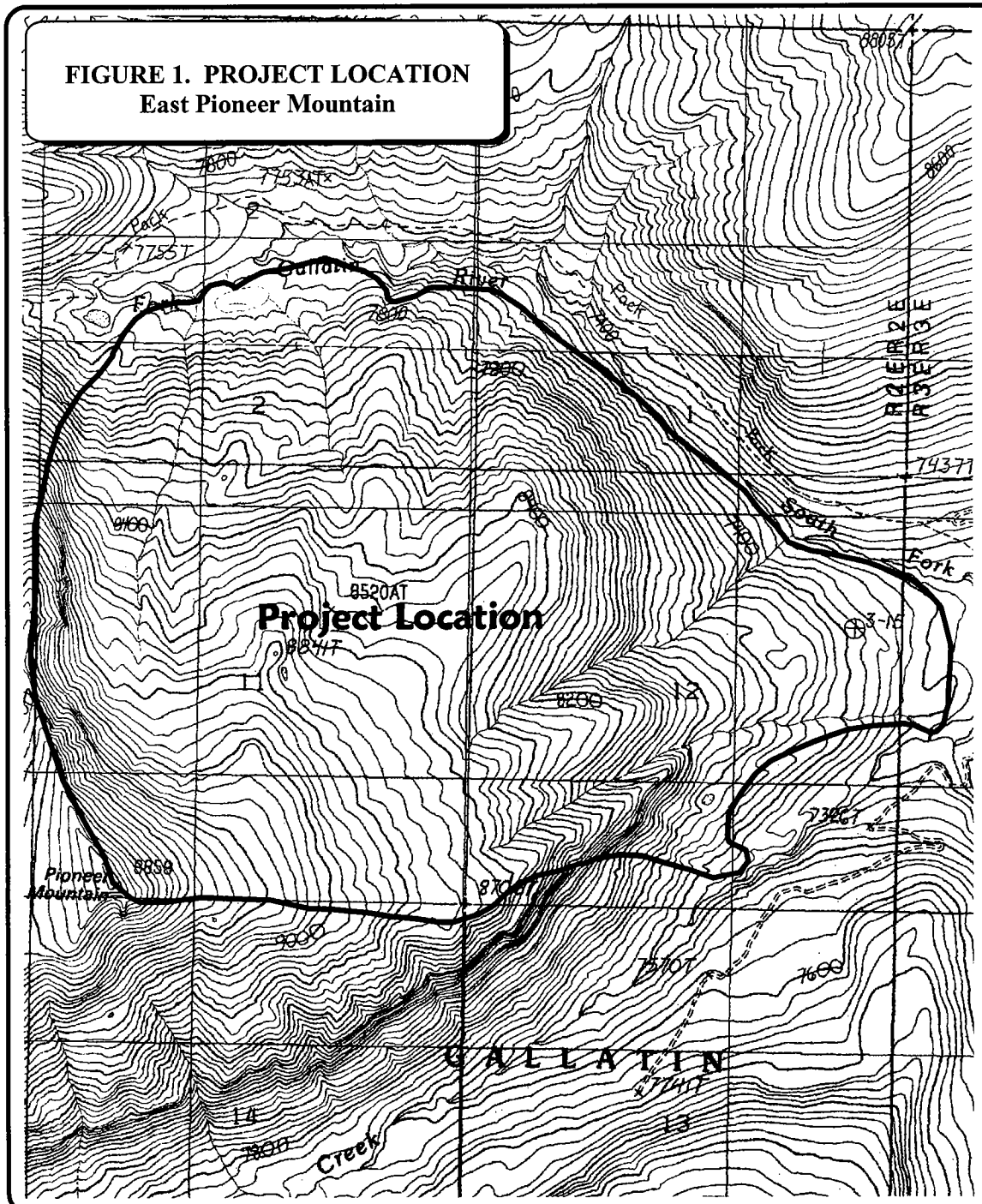
2.0 METHODS

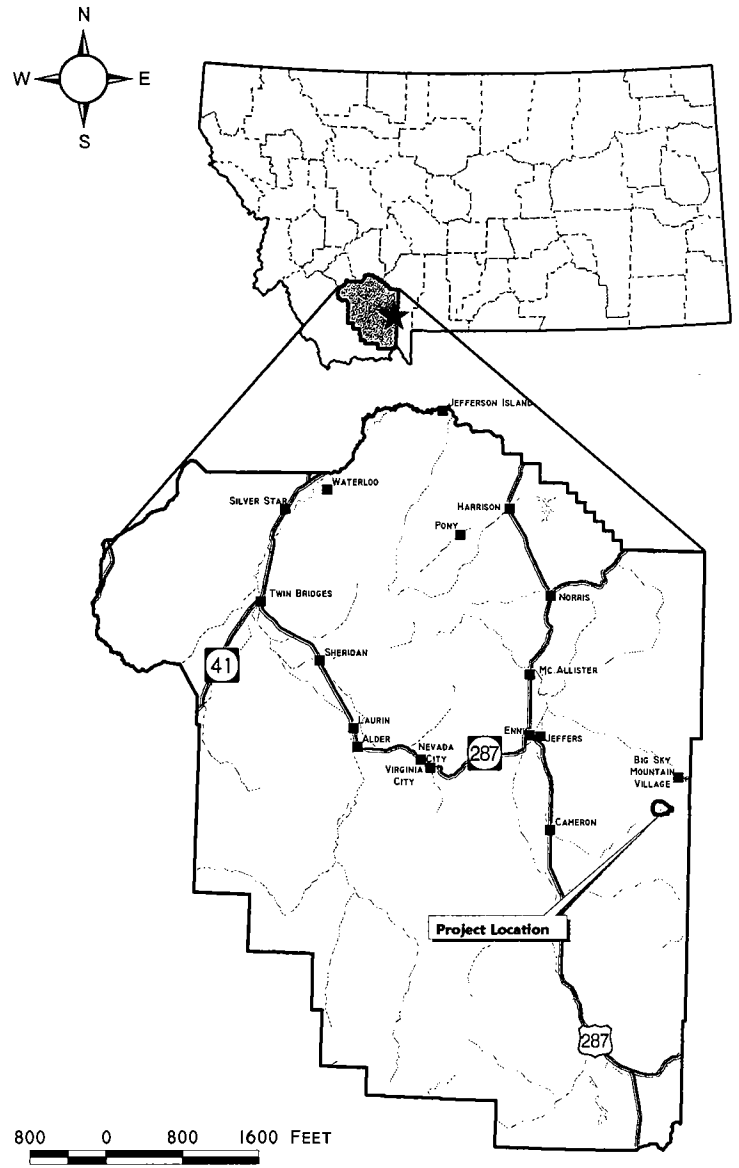
Wetland Restoration Site Selection and Design
Restoration sites were selected in negotiations from those AOC locations that appear to be favorable for re-creating wetland conditions. These restoration activities are proposed to begin in 2004. At some locations, constructed channels across disturbed areas are proposed because they appear to be feasible and likely to succeed.

Wetland Mitigation Site Selection and Design
Wetland mitigation sites were selected in negotiations based on the likelihood of restoring, enhancing or creating and maintaining wetland conditions. These sites are generally on less steep areas adjacent to stream channels or other wetland areas. Some of these sites were partially cleared of trees in the past and would require less tree disturbance for mitigation construction.

Vegetation Design
Plant species were selected for restoration and mitigation representing trees, shrubs, forbs, grasses and grass-like plants (sedges and rushes). Plants selected were those that are most common in East Pioneer Mountain wetlands and are most likely to establish successfully. Additional plants were selected that are common and that are commercially available as seed. Vegetation constancy data were calculated from Army Corps Routine Wetland Determination Forms completed by Land & Water Consulting (LWC) in 2002 on East Pioneer Mountain.

FIGURE 1. PROJECT LOCATION
East Pioneer Mountain





PROJECT #: 140347.08A
DATE: FEB 2003
LOCATION:
PROJECT MANAGER: J. BERGLUND
DRAWN BY: B. STEINEBACH

LAND & WATER CONSULTING, INC.
1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

Constancy is the percentage of the sites at which a plant occurred and is a measure of how common the plant is among a group of wetlands. All plant names in this report are according to Hitchcock and Cronquist (1973) *Flora of the Pacific Northwest.*

Stream Channel Design
Stable stream channels were designed for culvert removal sites and for restoration/mitigation sites requiring channel reconstruction. Channel design procedures were based on principles contained in Chin (1989), Montgomery and Buffington (1997), Rosgen (1996), Thomas & Others (2000), and U.S. Army Corps of Engineers (1991).

Guidance
Guidance used to design this restoration/mitigation plan was derived from many sources including Denbow and others (1996), Henry and Amoros (1995), Kolka and others (2000), Milner (2003), Mitsch and others (1998), Mitsch and Wilson (1996), Ossinger (1999), U.S. Army Corps of Engineers (1991c), Streever and Zedler (2000), U.S. Army Corps of Engineers: Sacramento District Regulatory Program (1996), U.S. Environmental Protection Agency (1993) and Zedler (2000). The most recent guidance document from the Army Corps used in this restoration/mitigation plan was:

Army Corps of Engineers. 2002. *Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.* Regulatory Guidance Letter No. 02-2 dated December 24, 2002. 16p.

3.0 RESTORATION AND MITIGATION

This plan is designed to restore wetland and channel conditions at each described site on East Pioneer Mountain to conditions similar to those before disturbance. For mitigation activities, the plan is designed to enhance or create wetland conditions similar to adjacent wetlands. These goals will be achieved at each site by:

1. **Topographic Adjustment**: Restoring pre-disturbance conditions as closely as practicable or to producing topography that promotes stable wetland and channel conditions.
2. **Hydrologic Restoration/Mitigation**: Allowing the wetland hydrologic regime to re-establish or enhancing hydrologic conditions that promote wetland conditions. Reconstructing stream channels where needed.
3. **Soil Restoration/Mitigation**: Exposing the original wetland soil or establishing hydrologic conditions that encourage formation of hydric soil features.
4. **Vegetation Restoration/Mitigation**: Planting vegetation similar to that which occurs in nearby wetlands and along nearby channels.
5. **Erosion Control**: Providing erosion control where needed.
6. **Success Criteria**: Identifying success criteria for restoration/mitigation activities.
7. **Contingency Plans**: Establishing contingency plans for sites that do not meet success criteria.

8. **Monitoring**: Monitoring representative wetland/channel restoration sites, mitigation sites and reference areas for comparison with each other and with success criteria.
9. **Scheduling**: Maintaining a schedule with timelines for all restoration, mitigation and monitoring activities.
10. **Reporting**: Providing YMC and EPA with timely reports summarizing activities and conditions.

3.1 Restoration, Mitigation and Reference Sites

Restoration Sites
Table 1 lists 39 sites selected for wetland restoration at East Pioneer Mountain. These 39 sites total 84,666 square feet or 1.944 acres to be restored. **Appendix A** includes a large map illustrating the locations of all restoration sites. **Appendix B** includes descriptions of each restoration site, the specific restoration activities planned and illustrations of restoration features. The 39 sites have been grouped into six zones (A, B, C, D, E and F) according to similarities of location, site characteristics and restoration/mitigation needs.

Two sites have simple restoration requirements, only needing additional vegetation plantings to complete restoration (AOC 18 & 78). The majority of sites will require minor excavation, surface smoothing, water spreader installation, vegetation plantings and erosion control. As set forth in **Appendix B Site Descriptions** three sites have more complex topography and may require more detailed site evaluation prior to finalizing the plan (AOC 22, AOC 68 & Mitigation Site D). Detailed monitoring will be initiated at representative wetland restoration sites in zones A, B, C and D.

Mitigation Sites
Four wetland mitigation sites have been identified totaling 54,171 square feet or approximately 1.24 acres (**Table 2**). Locations are presented in **Appendix A** and site plans in **Appendix B**. Detailed monitoring will be initiated at each mitigation site including monitoring wells and vegetation transects.

Reference Wetland Sites
Potential wetland reference sites were identified based on their proximity and similarity to those wetland restoration sites that are subject to detailed monitoring under this plan (**Table 3).** Detailed monitoring will be initiated at each reference site including monitoring wells and vegetation transects. **Appendix C** includes Routine Wetland Determination Forms for the potential reference wetland sites.

Table 1: ***East Pioneer Mountain Wetland Restoration Sites***

AOC #	Zone	Culvert #	Watershed	Quadrant	AOC Size (FT^2)[1]	Restoration Area Size (FT^2)	Restoration Area (Acres)
4	A	10, 11 & 12	Pioneer 1	C-2	13,360	9,197	0.21
10	A	13	Pioneer 1	B-3	6,810	6,810	0.16
15	B	None	Pioneer 1	B-6	90	90*	0.002
17	B	None	Pioneer 1	B-6	2,570	4,897**	0.11
18	B	None	Pioneer 1	B-6	1,730	1,730	0.04
22	B	None	Pioneer 1	B-5	14,080	14,080	0.32
23	B	None	Pioneer 1	B-4	1,130	459*	0.001
24	B	None	Pioneer 1	B-4	50	50*	0.01
29	B	26	Pioneer 1	B-6 / C-6	330	330	0.007
30	B	None	Pioneer 1	B-6	5,043	5,043	0.12
32	B	None	Pioneer 1	B-6	165	165	0.004
33	B	None	Pioneer 1	B-5 / B-6	11,690	11,690	0.27
34	C	None	Pioneer 1&2	C-6	2,025	2,025	0.05
39	D	None	Pioneer 2	E-2 / F-2	1,344	1,344	0.03
40	D	59	Pioneer 2	E-2	1,955	1,955	0.05
44	C	None	Pioneer 2	E-5	2,370	2,370	0.05
45	C	28	Pioneer 2	D-5	2,300	2,300	0.05
46	C	None	Pioneer 2	D-5 / D-6	200	200*	0.005
47	C	None	Pioneer 2	C-6 / D-6	400	400	0.004
48	C	27	Pioneer 2	C-6	1,470	1,470	0.03
58	E	None	Pioneer 3	E-7	248	248	0.005
59	E	40	Pioneer 3	E-7	102	102	0.002
60	E	54	Pioneer 3	E-7	45	45	0.001
61	E	53	Pioneer 3	D-7 / E-7	45	45	0.001
68	F	37,46	Pioneer 4	G-7 / H-7	6,171	6,171	0.14
70	F	47	Pioneer 4	G-7	860	860	0.02
71	F	None	Pioneer 4	F-7	114	114	0.002
73	E	41	Pioneer 4	E-8	49	49	0.001
74	E	None	Pioneer 4	E-8	228	228	0.005
75	E	42	Pioneer 4	E-8	207	207	0.005
76	E	43	Pioneer 4	E-8	60	60	0.001
77	E	None	Pioneer 4	E-8	20	20	0.0004
78	E	None	Pioneer 4	E-8	1,530	1,530	0.04
81	B	None	Pioneer 1	B-5	540	540	0.01
1007	B	None	Pioneer 1	B-6	4,487	4,487	0.103
1012	C	None	Pioneer 2	C-6	610	610*	0.014
1013	C	None	Pioneer 2	D-6	610	610	0.014
1014	C	None	Pioneer 2	D-6	741	741	0.017
1027	B	None	Pioneer 1	B-5	1,394	1,394	0.032
Totals					**87,173**	**84,666**	**1.944**

[1] As determined by field verification and best professional judgement

* Size to be verified in field in 2004. These figures are used throughout this plan and are subject to the same potential adjustments.

** Size may be adjusted in 2004. These figures are used throughout this plan and are subject to the same potential adjustments.

Table 1a: *East Pioneer Mountain Wetland Restoration Sites (by zone)*

AOC #	Zone	Culvert #	Watershed	Quadrant	AOC Size (FT2)[1]	Restoration Area Size (FT2)	Restoration Area (Acres)
4	A	10, 11 & 12	Pioneer 1	C-2	13,360	9,197	0.21
10	A	13	Pioneer 1	B-3	6,810	6,810	0.16
15	B	None	Pioneer 1	B-6	90	90*	0.002
17	B	None	Pioneer 1	B-6	2,570	4,897**	0.11
18	B	None	Pioneer 1	B-6	1,730	1,730	0.04
22	B	None	Pioneer 1	B-5	14,080	14,080	0.32
23	B	None	Pioneer 1	B-4	1,130	459*	0.001
24	B	None	Pioneer 1	B-4	50	50*	0.01
29	B	26	Pioneer 1	B-6 / C-6	330	330	0.007
30	B	None	Pioneer 1	B-6	5,043	5,043	0.12
32	B	None	Pioneer 1	B-6	165	165	0.004
33	B	None	Pioneer 1	B-5 / B-6	11,690	11,690	0.27
81	B	None	Pioneer 1	B-5	540	540	0.01
1007	B	None	Pioneer 1	B-6	4,487	4,487	0.103
1027	B	None	Pioneer 1	B-5	1,394	1,394	0.032
34	C	None	Pioneer 1&2	C-6	2,025	2,025	0.05
44	C	None	Pioneer 2	E-5	2,370	2,370	0.05
45	C	28	Pioneer 2	D-5	2,300	2,300	0.05
46	C	None	Pioneer 2	D-5 / D-6	200	200*	0.005
47	C	None	Pioneer 2	C-6 / D-6	400	400	0.004
48	C	27	Pioneer 2	C-6	1,470	1,470	0.03
1012	C	None	Pioneer 2	C-6	610	610*	0.014
1013	C	None	Pioneer 2	D-6	610	610	0.014
1014	C	None	Pioneer 2	D-6	741	741	0.017
39	D	None	Pioneer 2	E-2 / F-2	1,344	1,344	0.03
40	D	59	Pioneer 2	E-2	1,955	1,955	0.05
58	E	None	Pioneer 3	E-7	248	248	0.005
59	E	40	Pioneer 3	E-7	102	102	0.002
60	E	54	Pioneer 3	E-7	45	45	0.001
61	E	53	Pioneer 3	D-7 / E-7	45	45	0.001
73	E	41	Pioneer 4	E-8	49	49	0.001
74	E	None	Pioneer 4	E-8	228	228	0.005
75	E	42	Pioneer 4	E-8	207	207	0.005
76	E	43	Pioneer 4	E-8	60	60	0.001
77	E	None	Pioneer 4	E-8	20	20	0.0004
78	E	None	Pioneer 4	E-8	1,530	1,530	0.04
68	F	37,46	Pioneer 4	G-7 / H-7	6,171	6,171	0.14
70	F	47	Pioneer 4	G-7	860	860	0.02
71	F	None	Pioneer 4	F-7	114	114	0.002
Totals					**87,173**	**84,666**	**1.944**

[1] As determined by field verification and best professional judgement

* Size to be verified in field in 2004. These figures are used throughout this plan and are subject to the same potential adjustments.

** Size may be adjusted in 2004. These figures are used throughout this plan and are subject to the same potential adjustments.

Table 2: ***East Pioneer Mountain Wetland Mitigation Sites***

Site	Pioneer Mountain Watershed	Map Coordinates	Area (FT^2)	Area (Acres)
A-M	2	C-6	22,486	0.52
B-M	2	D-5	15,055	0.34
C-M	1	B-5	12,108	0.28**
D-M	1	B-4	4,522	0.10**
		Total:	**54,171**	**1.24**

** Size may be adjusted in 2004

Table 3: ***Potential Wetland Reference Areas for Each Detailed Restoration Monitoring Site***

Monitoring Site (AOC #)	Monitoring Site Coordinates	Potential Reference Area	Potential Reference Area Comments
4	C-2	WPM-10	Restoration site is connected to WPM-10 and follows the same drainage patterns.
22	B-5	WPM-16	WPM-16 is located adjacent to the restoration site.
30	B-6	WPM-26	WPM-26 located above the restoration site and connected along the bottom boundary.
33	B-5 / B-6	WPM-20	WPM-20 is located adjacent to the restoration site with similar topography and drainage.
39	E-2 / F-2	2	Wetland 2 is a large wetland complex / drainage with the restoration site draining into the wetland complex across a run.
45	D-5	WPM-4	WPM-4 is located adjacent to the restoration site and follows the same drainage.
48	C-6	WPM-27	WPM-27 is located adjacent to the restoration site – the reference area would be the channel within WPM-27

3.2 Restoration/Mitigation Activities

This section describes the details of restoration/mitigation activities to be used at East Pioneer Mountain. These activities include Topographic Adjustment, Hydrologic Adjustment, Soil Restoration/mitigation, Vegetation Restoration/mitigation, Erosion Control and Oversight.

3.2.1 Topographic Adjustment

The goal of topographic adjustment is to return each site to its original topography or to create a topography that promotes wetland conditions. On restoration sites where wetlands were filled, the original surface elevation will be inferred from surrounding terrain and compared with current conditions. Excavations will be made to expose the original soil surface as determined by a soil scientist with wetland experience. If the original soil surface is no longer present (some restoration sites and at all mitigation sites), the topography will be adjusted to promote wetland conditions. **Figures 2a** and **2b** illustrate the general concepts for wetland design on nearly level and on sloping sites. The final wetland topography will be adjusted by shallow excavation to define each wetland area as slightly lower in topography than the surroundings. The slope will be smoothed along the contours to encourage even water distribution throughout the wetland. Water spreaders on the upper end and controlled outlets on the lower end will be installed where appropriate. Details for each site are provided in **Appendix B**.

3.2.2 Hydrologic Restoration/Mitigation

Hydrologic restoration/mitigation activities will promote a wetland moisture regime that meets wetland criteria and that supports wetland soil and wetland vegetation development. Hydrologic restoration will result in conditions similar to pre-disturbance conditions. Hydrologic restoration will also include reconstructing stable stream channels as discussed in **Section 3.2.5**.

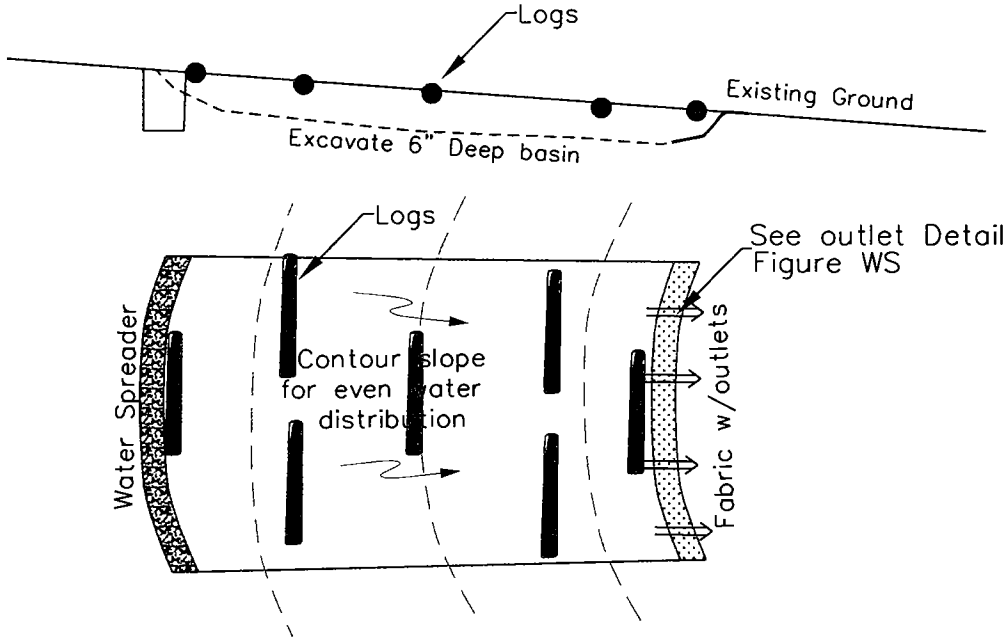
Wetland hydrology will be monitored in representative restored wetlands, in mitigation sites and in each reference site. Until post-restoration hydrology is monitored, no specific actions are planned to modify flow routes or amounts in disturbed wetland areas.

The proposed topographic adjustments encourage even water distribution across wetland sites by shallow excavation and smoothing along the contour. Water spreaders are incorporated into some site plans to further ensure even water distribution. The largest sites may have multiple water spreaders. Wetland outlets are designed to release water without creating gully erosion and sedimentation downhill. Logs will also be used on sites 4, 10, 17, 22, 30, 33, 45, A, B and C to promote even water distribution across the wetland area as illustrated in **Figure 2a**. Logs will not be used at other sites due to their small size or narrow shape. These logs will be approximately twelve inches in diameter and will be partially buried so that three to four inches are exposed above the ground surface. Logs will be oriented across the contour and staggered down the slope to promote even water distribution. The number of logs will vary by site due to size, steepness and other conditions.

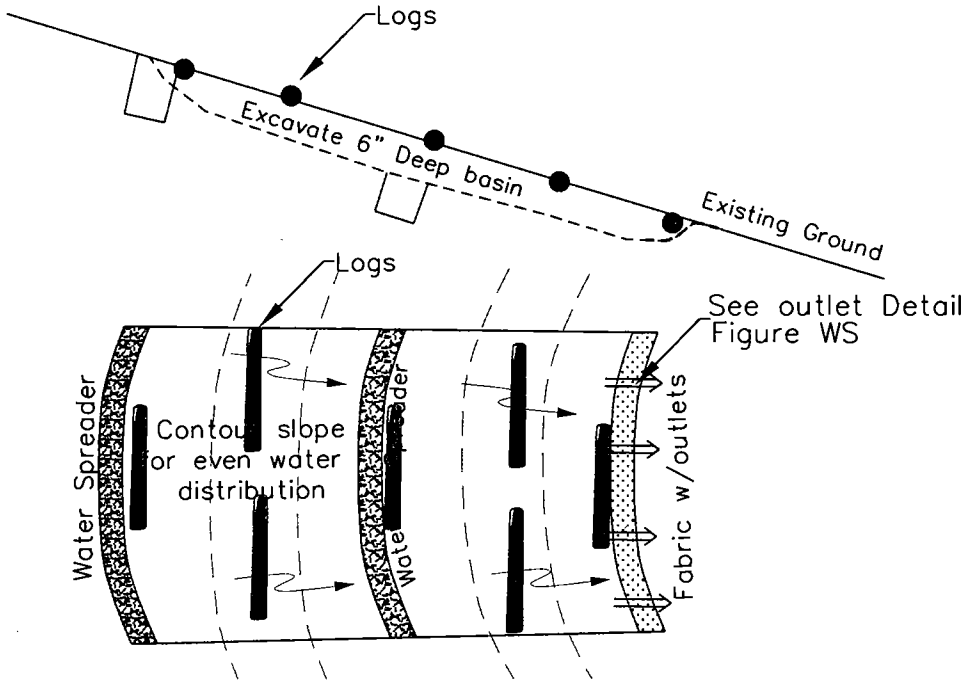
Figure -2a
Water Spreader - General Wetland Design

YELLOWSTONE MOUNTAIN CLUB
WETLAND RESTORATION

Nearly Level Sites



Steeper Sites



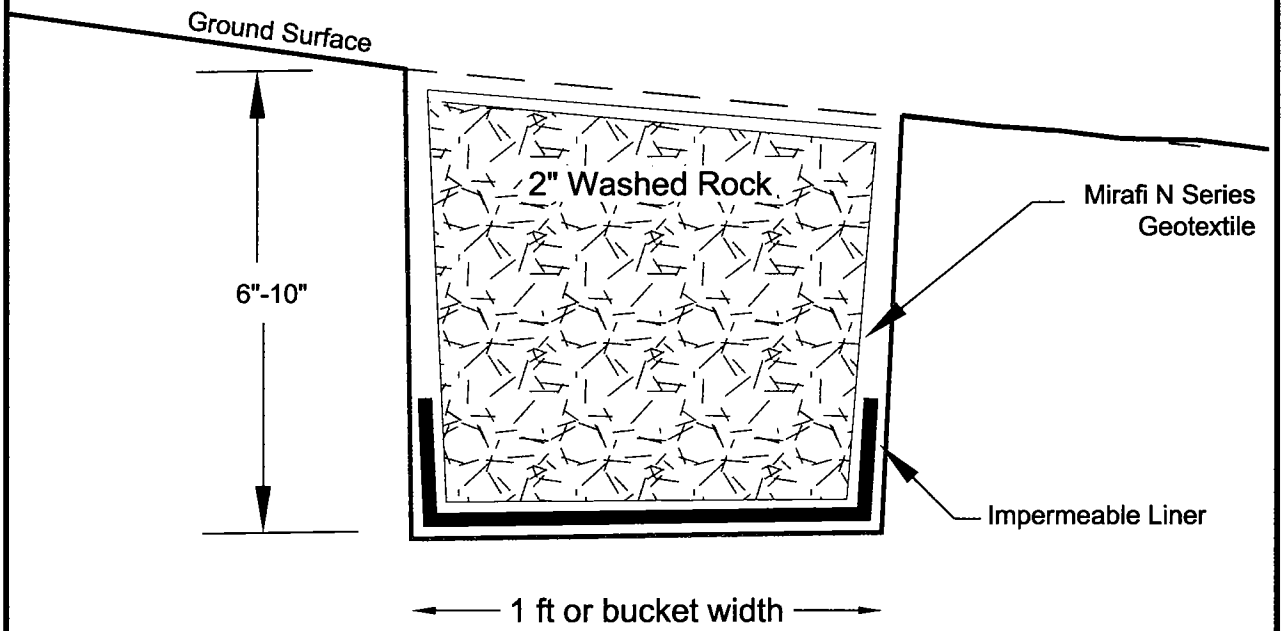
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

PLOTTED DATE: Jun/08/2004 - 04:42:51 pm
DRAWING NAME:
L:\140347 Golf Course\dwg\Final\wetland-design1.dwg
SHEET 1 OF 2

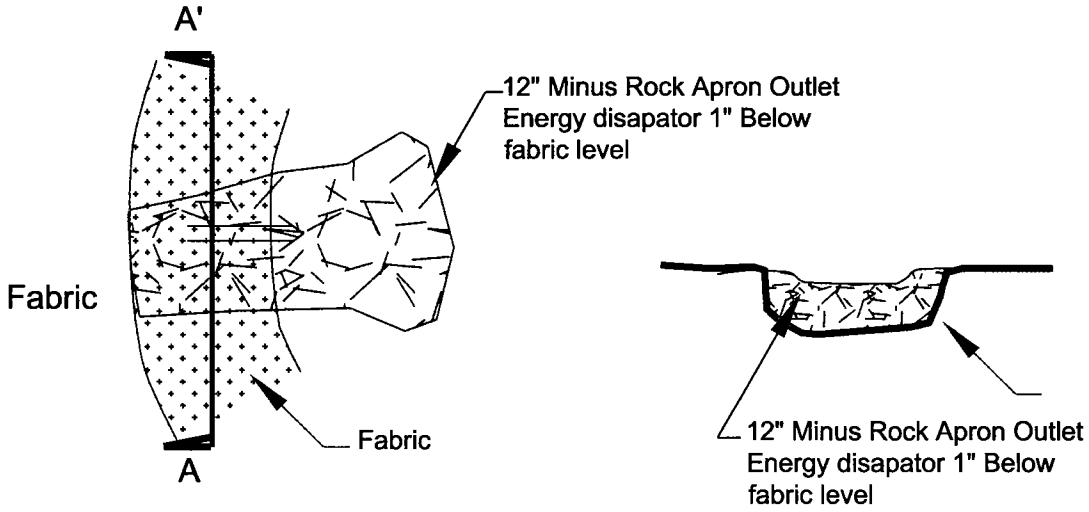
Figure -2b
Water Spreader & Outlet Detail

YELLOWSTONE MOUNTAIN CLUB
WETLAND RESTORATION

Trench Detail



Wetland Outlet Detail



Section 'A-A'

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

PLOTTED DATE: Jun/08/2004 - 04:43:18 pm
DRAWING NAME:
L:\140347 Golf Course\dwg\Final\wetland-design1.dwg
SHEET 2 OF 2

Channels to be restored on Pioneer Mountain are categorized into either Higher Energy or Lower Energy channels. Sites that include higher energy channels are 22, 39, 40, 48, 68 and 81. Sites that include lower energy channels are 44, 45, 58, 59, 60, 61, 70, 71, 73, 75 and 76. **Figures 3a** and **3b** illustrate how each of these two channel types will be restored.

3.2.3 Soil Restoration/Mitigation

Soil restoration/mitigation will result in soil conditions that meet wetland criteria and that support wetland vegetation. On sites where wetlands were filled, soil restoration will emphasize removing the overlying fill and exposing the original wetland soil. Excavation activities will be monitored by a professional soil scientist to accurately identify the original soil surface at sites where an original surface is still present. Once the original surface has been located, careful excavation will proceed to remove the overlying fill across the entire restoration site. Wetland soils at this location are distinct and easy to recognize. They typically have a dark, almost black surface layer with abundant organic matter. The subsoil typically has distinct gley colors with distinct mottles (redoximorphic features). Monitoring will document soil conditions at all restoration sites to record development of wetland soil conditions. On sites that were not filled and on mitigation sites, the proposed topographic adjustment and hydrologic restoration/mitigation will promote wetland soil conditions.

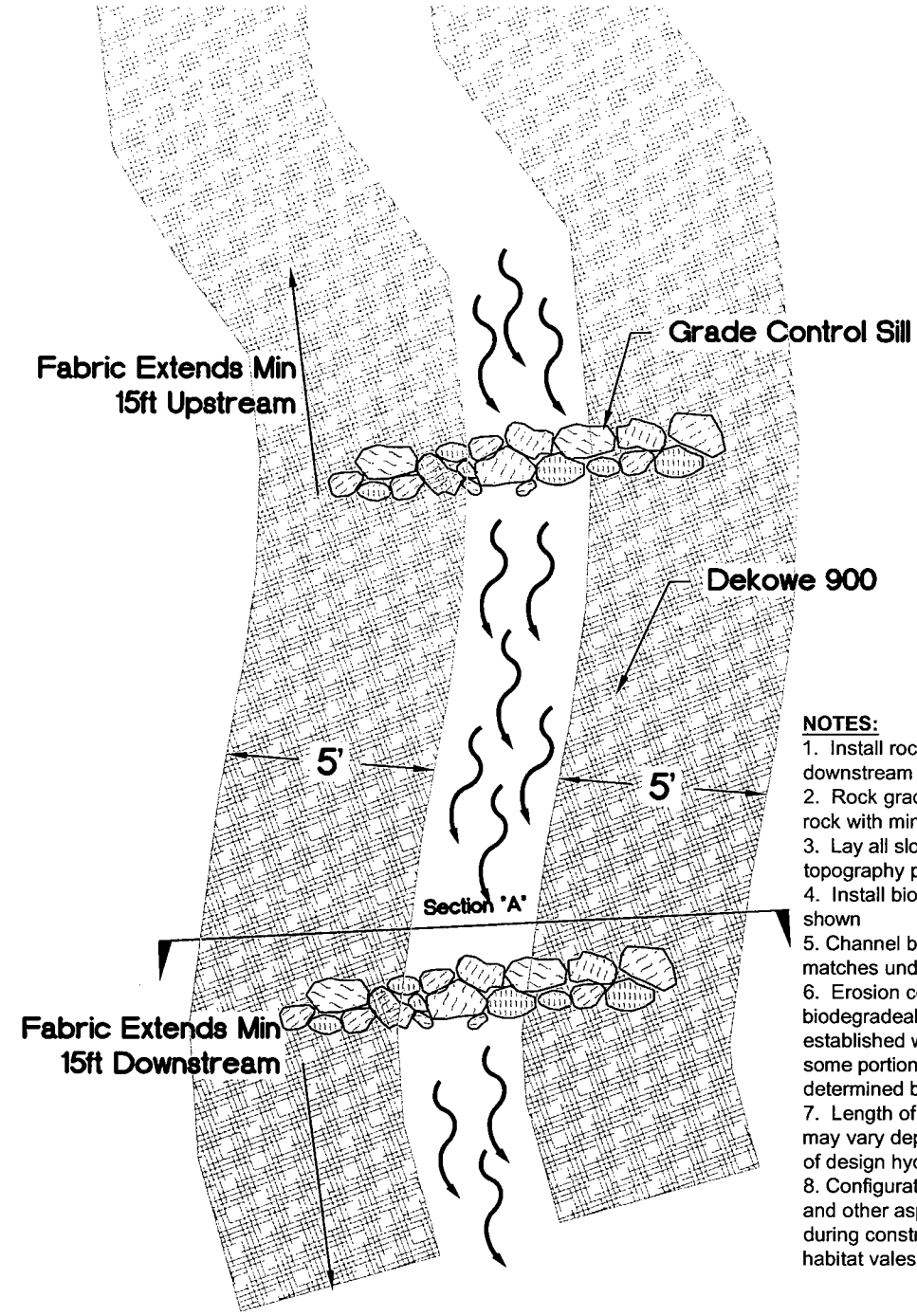
3.2.4 Vegetation Restoration/Mitigation

Vegetation restoration/mitigation will result in a dominance of wetland plant species that occur in wetlands across East Pioneer Mountain. The vegetation information used to determine vegetation restoration/mitigation includes:

- Compilation of a complete species list for all plants identified on the mountain.
- Documentation of dominant vegetation on Army Corps Routine Wetland Determination forms at each of the wetlands mapped by LWC.
- Calculation of constancy data for the species documented on Army Corps forms for the entire mountain and by zone (**Appendix D**).
- Experience of LWC, EPA and custom plant material providers with the success of potential plant species for restoration/mitigation.

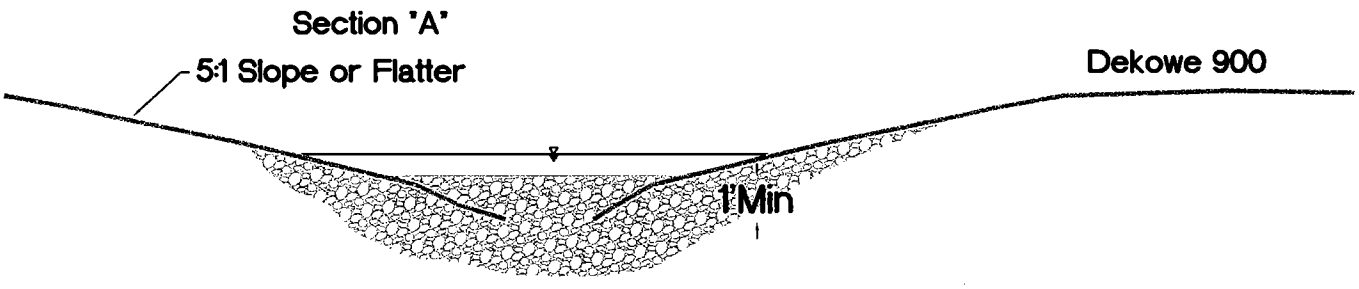
Plant Species at East Pioneer Mountain
Table 4 lists the 97 plant species observed on East Pioneer Mountain and includes the wetland status of each species. Army Corps routine wetland determination forms listing the dominant plant species at each of the wetlands areas delineated by LWC in 2002 are included in **Appendix D** of the East Pioneer Mountain Supplemental Wetland Evaluation Report (Land & Water Consulting 2003a).

Fig. 3A: Typical Plan for Restoration of Low Energy Channels



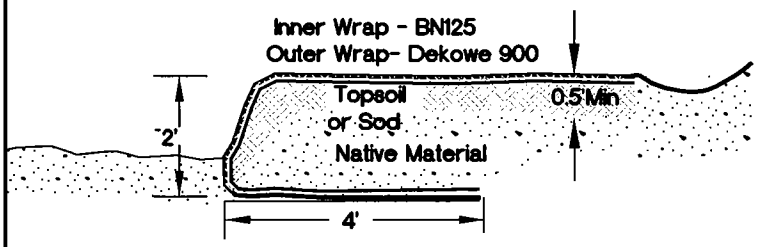
NOTES:

1. Install rock grade control sill on upstream and downstream sides of culvert removal site.
2. Rock grade control sill to be constructed of angular rock with min diameter of 8"
3. Lay all slopes back to 5:1 or flatter unless natural topography prohibits this.
4. Install biodegradable erosion control fabric as shown
5. Channel bottom will be constructed of material that matches undisturbed channels above and below site
6. Erosion control fabric will be constructed of biodegradeable materials. Pre-vegetated coir with established wetland vegetation may be utilized along some portions of stream bank. Exact locations to be determined by design hydrologist.
7. Length of fabric wrap extending into stream bank may vary depending on site conditions and judgement of design hydrologist.
8. Configuration of channel form, wood, step spacing, and other aspects of this design may be modified during construction by oversight hydrologist to optimize habitat vales and channel stability.



LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807	PROJ NO: 140347	DRAWN: MW	PROJECT NAME: Yellowstone Mtn Club	FIGURE: 3A
	LOCATION: Big Sky, MT	PROJ MGR: PC		
	SCALE: Not to Scale	CHECKED: APPVD:	DRAWING TITLE: Restoration of Low Energy Channels	REV 2
	FILE NAME: Channel restoration.dwg	DATE: Jun/11/2004		

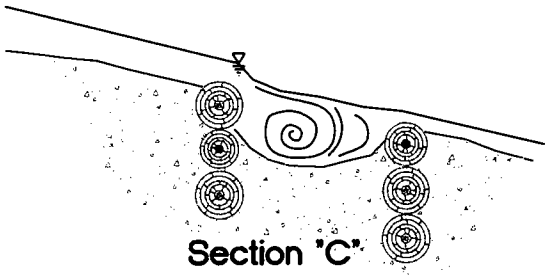
Fig. 3B: Typical Plan for Restoration of High Energy Channels



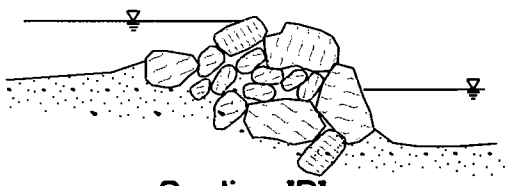
Section "A"

NOTES:

1. Configuration of channel form, wood, step spacing, and other aspects of this design may be modified during construction by oversight hydrologist to optimize habitat values and channel stability.
2. Erosion control fabric will be constructed of biodegradeable materials. Pre-vegetated coir with established wetland vegetation may be utilized along some portions of stream bank. Exact locations to be determined by design hydrologist.
3. Length of fabric wrap extending into stream bank may vary depending on site conditions and judgement of design hydrologist.



Section "C"



Section "B"

LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807	PROJ NO: 140347	DRAWN: MW	PROJECT NAME: Yellowstone Mtn Club	FIGURE: 3B
	LOCATION: Big Sky, MT	PROJ MGR: PC		
	SCALE: Not to Scale	CHECKED: APPVD:	DRAWING TITLE: Restoration of High Energy Channels	REV 2
	FILE NAME: Channel restoration.dwg	DATE: Jun/11/2004		

Table 4: ***Plant Species Observed on East Pioneer Mountain by LWC***

Scientific Name	Common Name	Wetland Status [1]
Abies lasiocarpa	sub-alpine fir	FACU
Achillea millefolium	yarrow	FACU
Agrostis exarata	spike bentgrass	FACW
Agrostis variabilis	variant bentgrass	--
Allium brevistylum	short-style onion	--
Angelica arguta	Lyall's angelica	FACW
Aquilegia flavescens	yellow columbine	--
Arnica cordifolia	heartleaf arnica	--
Arnica latifolia	mountain arnica	FAC-
Arnica longifolia	seep-spring arnica	FACW
Aster conspicuus	showy aster	--
Aster foliaceus	leafy-bracted aster	FACW-
Aster engelmannii	Engelmanns aster	--
Berberis repens	Oregon grape	--
Bromus ciliatus	fringed brome	FAC+
Bromus inermis	smooth brome	--
Calamagrostis canadensis	blue-joint reedgrass	FACW+
Caltha leptosepala	marsh-marigold	OBL
Carex aquatilis	water sedge	OBL
Carex disperma	soft-leaf sedge	FACW
Carex geyeri	elk sedge	--
Carex microptera	small-wing sedge	FAC
Carex neurophora	alpine nerve sedge	FACW
Carex phaeocephala	mountain-hare sedge	FACU
Carex utriculata	beaked sedge	OBL
Castilleja rhexifolia	rhexia-leaf Indian paintbrush	FAC
Centaurea maculosa	spotted knapweed	--
Cirsium arvense	Canada thistle	FACU+
Dactylis glomerata	orchard grass	FACU
Delphinium bicolor	Montana larkspur	--
Deschampsia cespitosa	tufted hairgrass	FACW
Deschampsia elongata	slender hairgrass	FACW-
Eleocharis palustris	Creeping spikerush	OBL
Elymus glaucus	blue wild-rye	FACU
Epilobium angustifolium	fireweed	FACU+
Epilobium ciliatum	hairy willow-herb	FACW-
Equisetum arvense	field horsetail	FAC
Erigeron peregrinus	wandering fleabane	FACW
Erythronium grandiflorum	glacier lily	FAC-
Fragaria virginiana	Virginia strawberry	--
Galium boreale	northern bedstraw	FACU
Geranium richardsonii	white geranium	FACU+
Geranium viscosissimum	sticky purple geranium	FACU+
Geum macrophyllum	large-leaf avens	FACW+
Glyceria elata	tall manna grass	FACW+

Table 4 (continued): ***Plant Species Observed on East Pioneer Mountain by LWC***

Scientific Name	Common Name	Wetland Status [1]
Habenaria dilatata	leafy white orchid	FACW+
Heracleum lanatum	cow-parsnip	FAC
Hydrophyllum capitatum	wool breeches	--
Juncus balticus	Baltic rush	OBL
Juncus drummondii	Drummond's rush	FACW-
Juncus effusus	soft rush	FACW+
Juncus ensifolius	dagger-leaf rush	FACW
Juncus mertensianus	Merten's rush	OBL
Juncus parryi	Parry's rush	FAC+
Juncus regelii	Regel's rush	FACW
Ledum glandulosum	Labrador tea	FACW+
Luzula parviflora	small-flower woodrush	FAC-
Mertensia ciliata	streamside bluebells	FACW+
Mimulus guttatus	common monkey-flower	OBL
Mimulus lewisii	Lewis' monkey-flower	FACW+
Mitella pentandra	five-point bishop's-cap	FACW+
Nemophila brevifolia	great basin nemophila	--
Parnassia fimbriata	fringed grass-of-parnassus	OBL
Phleum alpinum	alpine Timothy	FAC
Phleum pratense	Timothy	FACU
Picea engelmannii	Engelmann's spruce	FAC
Pinus albicaulis	white-barked pine	--
Plantago tweedyi	Tweedy's plantain	--
Poa alpina	alpine bluegrass	FAC
Poa cusickii	Cusick's bluegrass	FAC
Poa palustris	fowl bluegrass	FAC
Poa pratensis	Kentucky bluegrass	FACU+
Polygonum bistortoides	American bistort	FACW+
Potentilla diversifolia	varileaf cinquefoil	FACU
Ranunculus eschscholtzii	Eschscholtz buttercup	FACW
Ranunculus uncinatus	hooked buttercup	FAC
Ribes hudsonianum	Hudson Bay currant	OBL
Ribes lacustre	swamp currant	FAC+
Rosa woodsii	wood rose	FACU
Rumex paucifolius	few-leaved dock	FAC-
Salix bebbiana	Bebb willow	FACW
Saxifraga arguta	brook saxifrage	FACW+
Sedum spp.	stonecrop	--
Senecio triangularis	Arrow-leaf groundsel	FACW+
Spiraea betulifolia	white spirea	NI
Streptopus amplexifolius	twisted stalk	FAC-
Thalictrum occidentale	western meadowrue	FACU
Taraxacum officinale	dandelion	FACU
Trifolium spp.	clover	--

Table 4 (continued): ***Plant Species Observed on East Pioneer Mountain by LWC***

Scientific Name	Common Name	Wetland Status [1]
Trollius laxus	American globeflower	OBL
Vaccinium scoparium	grouse whortleberry	FACU-
Valeriana sitchensis	Sitka valerian	FAC
Veronica americana	American speedwell	OBL
Veronica wormskjoldii	American alpine speedwell	FAC+
Zigadenus elegans	mountain death-camas	FAC+

[1] **OBL**=Obligate Wetland Plant, occurrence in wetlands is >99%.
FACW=Facultative Wetland Plant, occurrence in wetlands is 67-99%.
FAC=Facultative Plants, occurrence in wetlands is 34-66%.
FACU=Facultative Upland Plants, occurrence in wetlands is 1-33%.
'+'=indicates wetter; '-'=indicates drier.
NI=No Indicator status available due to inconclusive data;
'- -'= Plant not evaluated.

Wetland Plant Species Selected for Restoration/Mitigation

Table 5 lists the plant species proposed for restoration/mitigation sites at East Pioneer Mountain, the source of plant materials and the method of planting. These species were selected based on:

1. Their abundance at East Pioneer Mountain as documented by constancy calculations presented in **Appendix D.**
2. Their availability for purchase and the practicality of seed collection at East Pioneer Mountain.
3. Their likelihood for success based on the experience of LWC, EPA and custom plant material providers.

Trees will be a minimum of 6 feet tall and will be transplanted from adjacent sites or purchased as nursery stock. Trees will be planted only in selected sites subject to the limitations described below. Shrubs will be purchased as nursery stock and planted. Grasses will be purchased and planted as seed. Sedges will be purchased as seed, grown in a greenhouse and planted as plugs. Rushes and forbs will be collected as seed, grown in a greenhouse as plugs and planted. All containerized plugs will be 10 cubic inches in size.

Zone-Specific Vegetation Prescriptions

Table 6 lists estimated vegetation prescriptions for restoration sites grouped by zone on East Pioneer Mountain. These prescriptions use the plant species listed in **Table 5** above but are customized for each zone. Vegetation prescriptions for each zone were determined using the constancy data presented in **Appendix D**. Individual prescriptions are not considered necessary since wetland areas within each zone have relatively similar vegetation. The acreages, numbers of plugs, pounds of seed and numbers of trees presented in **Table 6** are estimated totals for each zone and not for individual restoration sites. Few trees are proposed at these locations since most are located on ski runs where trees would present a safety hazard. **Table 7** lists vegetation prescriptions for individual restoration sites. The acreages, numbers of plugs, pounds of seed and numbers of trees presented in **Table 7** are estimated totals for each individual mitigation site. The vegetation prescriptions (species selection and distribution within sites) consider ecological conditions as well as planned use of nearby uplands.

Table 5: ***Plant Species and Sources Selected for Restoration/Mitigation***

Scientific Name	Common Name	Source
Trees		
Abies lasiocarpa	Subalpine fir	Transplant or purchase nursery stock and plant
Picea engelmannii	Engelmann spruce	Transplant or purchase nursery stock and plant
Shrubs		
Ribes lacustre	swamp currant	Purchase nursery stock and plant
Grasses, Sedges and Rushes		
Calamagrostis canadensis	blue-joint reedgrass	Purchase seed and plant as seed
Carex aquatilis	water sedge	Purchase seed, grow container plugs and plant
Carex microptera	Small-wing sedge	Purchase seed, grow container plugs and plant
Carex rostrata	beaked sedge	Purchase seed, grow container plugs and plant
Elymus glaucus	blue wild rye	Purchase seed and plant as seed
Glyceria elata	tall mannagrass	Purchase seed and plant as seed
Juncus ensifolius/regelii	dagger-Leaf/ Regels rush	Collect seed, grow container plugs and plant
Forbs		
Habenaria dilatata	bog orchid	Collect seed, grow container plugs and plant
Heracleum lanatum	cow parsnip	Collect seed, grow container plugs and plant
Saxifrage arguta	Brooks saxifrage	Collect seed, grow container plugs and plant
Senecio triangularis	arrowleaf groundsel	Collect seed, grow container plugs and plant,
Trollius laxus	American globe flower	Collect seed, grow container plugs and plant

Wetland Coir

Wetland coir (manufactured wetland sod) may be used on some restoration and mitigation sites. This wetland coir would be custom-grown to contain sedge, rush and/or grass species listed in Table 2. The most likely use would be following final topographic adjustment if that final topography includes steeper slopes with erosion concerns. The wetland coir would be placed along the most likely paths of surface water runoff or used in a manner similar to drop structures to armour short steep slopes between less steep portions of the wetland. Use of wetland coir may result in adjustments to the distribution of plants.

Vegetation Planting Sequence

Species to be planted as seed will be planted immediately following topographic adjustment most likely using a hydroseeder where feasible with mulch and tackifier added. This work is likely to take place in late-summer as soon as conditions allow equipment access.

The greenhouse-grown plugs, nursery stock and trees will be planted before August 1 of 2004 or in the spring of 2005. Spring plantings will occur as soon as possible following snowmelt and before surface soils dry out. No plantings will occur after August 1 in any year to ensure establishment before the end of the growing season.

Vegetation for Channel Restoration Sites

Vegetation for channel restoration will be dominated by native grasses common to channels across East Pioneer Mountain. Species will include bluejoint reedgrass, blue wildrye and mountain brome. Bluejoint reedgrass will be planted in the wettest microsites (channel bottom and immediate sides including under any erosion control fabric). Blue wildrye will be planted in microsites of intermediate wetness (channel sides and under any erosion control fabric). Mountain brome will be planted in the drier microsites (upper bank and higher disturbed areas).

Plantings will overlap to ensure revegetation success. Seeding rates will be 15-20 pounds per acre depending on seed size and site conditions. Bluejoint reedgrass and arrowleaf groundsel will also be planted behind grade control structures in microsites estimated to hold moisture the longest.

Exotic Vegetation and Noxious Weeds
Exotic plant invasion is a potential problem at all revegetation sites. **Appendix E** lists all exotic plants considered noxious weeds that require control under Montana law. Noxious weeds will be controlled throughout the monitoring period according to state law.

Other species exist at Pioneer Mountain that are considered by the agencies as less desirable wetland plants. These are: smooth brome (*Bromus inermis*), orchardgrass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*) and timothy (*Phleum pratense*). These plants are present in wetland and upland areas across the mountain and are more likely to invade restoration and mitigation sites if the sites are not aggressively revegetated with desirable species. These plants will not be seeded or planted in restored wetlands or mitigation sites and their presence will be controlled throughout the monitoring period in wetland restoration/mitigation areas to levels equivalent to reference areas. Control methods will concentrate on mechanical cutting or removal. Chemical herbicides may be used if necessary to control larger infestations.

3.2.5 Erosion Control

Erosion control measures during wetland restoration/mitigation construction will conform to state law and regulation. This will be accomplished by amendments to the existing state stormwater authorization and erosion control plan applicable to East Pioneer Mountain. Each wetland area will be evaluated during topographic adjustment and appropriate temporary erosion control methods installed to prevent impacts to wetlands and waters of the U.S. from the restoration/mitigation work. Work will be completed during low-flow and drier periods whenever possible. Water will be routed to avoid causing either excessive or insufficient water to reach adjacent wetland areas.

Wetland restoration and mitigation sites on steeper slopes will be protected from erosion at their lower end by installing outlets using erosion control fabric and rock outlets with rock aprons for energy dissipation (**Figures 2a** and **2b**). Erosion control fabric will include a biodegradable netting and either straw or coconut fiber mulch.

Table 6: *Estimated Vegetation Prescriptions for Restoration Sites in Each Zone*

Zone	Acres	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
A	0.37	*Abies lasiocarpa*	sub-alpine fir			10
		Picea engelmannii	Engelmann's spruce			10
		Calamagrostis canadensis	blue-joint reedgrass		1.85	
		Carex aquatilis	water sedge	1,087		
		Carex microptera	small-winged sedge	1,087		
		Elymus glaucus	blue wild-rye		1.85	
		Glyceria elata	tall manna grass		1.85	
		Ribes lacustre	prickly currant	500		
		Senecio triangularis	arrow-leaf groundsel	1,000		
		Trollius laxus	American globeflower	1,000		
		Total		**4674**	**5.55**	**20**
B	1.03	*Calamagrostis canadensis*	blue-joint reedgrass		5.15	
		Carex aquatilis	water sedge	1,896		
		Carex microptera	small-winged sedge	1,896		
		Carex utriculata	beaked sedge	1,896		
		Elymus glaucus	blue wild-rye		5.15	
		Glyceria elata	tall manna grass		5.15	
		Juncus ensifolius	dagger-leaf rush	2,408		
		Saxifraga arguta	brook saxifrage	1,000		
		Senecio triangularis	arrow-leaf groundsel	2,309		
		Trollius laxus	American globeflower	1,606		
		Total		**13,011**	**15.45**	**0**
C	0.25	*Abies lasiocarpa*	sub-alpine fir			4
		Picea engelmannii	Engelmann's spruce			4
		Calamagrostis canadensis	blue-joint reedgrass		1.25	
		Carex aquatilis	water sedge	531		
		Carex microptera	small-winged sedge	531		
		Carex utriculata	beaked sedge	646		
		Elymus glaucus	blue wild-rye		1.25	
		Glyceria elata	tall manna grass		1.25	
		Juncus ensifolius	dagger-leaf rush	600		
		Saxifraga arguta	brook saxifrage	250		
		Senecio triangularis	arrow-leaf groundsel	500		
		Trollius laxus	American globeflower	100		
		Total		**3158**	**3.75**	**8**
D	0.08	*Abies lasiocarpa*	sub-alpine fir			4
		Picea engelmannii	Engelmann's spruce			4
		Calamagrostis canadensis	blue-joint reedgrass		0.4	
		Carex aquatilis	water sedge	167		
		Carex microptera	small-winged sedge	167		
		Carex utriculata	beaked sedge	118		
		Elymus glaucus	blue wild-rye		0.4	
		Glyceria elata	tall manna grass		0.4	
		Heracleum lanatum	cow-parsnip	59		
		Senecio triangularis	arrow-leaf groundsel	200		
		Trollius laxus	American globeflower	300		
		Total		**1011**	**1.2**	**8**

Table 6 ***(continued): Estimated Vegetation Prescriptions for Restoration Sites in Each Zone***

Zone	Acres	Scientific Name	Common Name	% Plugs	# Plugs	Lbs. Seed	# Trees
E	**0.06**	*Calamagrostis canadensis*	blue-joint reedgrass			0.3	
		Carex aquatilis	water sedge	9	123		
		Carex microptera	small-winged sedge		123		
		Carex utriculata	beaked sedge	9	123		
		Elymus glaucus	blue wild-rye			0.3	
		Glyceria elata	tall manna grass			0.3	
		Heracleum lanatum	cow-parsnip	9	57		
		Juncus ensifolius	dagger-leaf rush	18	115		
		Ribes lacustre	swamp currant	14	86		
		Saxifraga arguta	brook saxifrage	14	45		
		Senecio triangularis	arrow-leaf groundsel	27	86		
			Total		**758**	**0.9**	**0**
F	**0.16**	*Calamagrostis canadensis*	blue-joint reedgrass			0.8	
		Carex aquatilis	water sedge	19	413		
		Carex microptera	small-winged sedge		413		
		Carex utriculata	beaked sedge	19	413		
		Elymus glaucus	blue wild-rye			0.8	
		Glyceria elata	tall manna grass			0.8	
		Ribes lacustre	swamp currant	13	223		
		Saxifraga arguta	brook saxifrage	13	223		
		Senecio triangularis	arrow-leaf groundsel	38	336		
			Total		**2,021**	**2.4**	**0**
Total	**1.95**	**(total for all zones)**			**24,633**	**29.25**	**36**

Table 7: ***Estimated Vegetation Prescriptions for Individual Mitigation Sites***

Site	Acres	Zone	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
A	**0.52**	**C**	*Abies lasiocarpa*	sub-alpine fir			4
			Picea engelmannii	Engelmann's spruce			4
			Calamagrostis canadensis	blue-joint reedgrass		2.6	
			Carex aquatilis	water sedge	1,141		
			Carex microptera	small-winged sedge	1,140		
			Carex utriculata	beaked sedge	1,349		
			Elymus glaucus	blue wild-rye		2.6	
			Glyceria elata	tall manna grass		2.6	
			Juncus ensifolius	dagger-leaf rush	1,181		
			Saxifraga arguta	brook saxifrage	590		
			Senecio triangularis	arrow-leaf groundsel	872		
			Trollius laxus	American globeflower	169		
			Total		**6,442**	**7.8**	**8**

Table 7 ***(continued): Estimated Vegetation Prescriptions for Individual Mitigation Sites***

Site	Acres	Zone	Scientific Name	Common Name	# Plugs	Lbs. Seed	# Trees
B	0.34	C	*Abies lasiocarpa*	sub-alpine fir			4
			Picea engelmannii	Engelmann's spruce			4
			Calamagrostis canadensis	blue-joint reedgrass		1.75	
			Carex aquatilis	water sedge	818		
			Carex microptera	small-winged sedge	818		
			Carex utriculata	beaked sedge	903		
			Elymus glaucus	blue wild-rye		1.75	
			Glyceria elata	tall manna grass		1.75	
			Juncus ensifolius	dagger-leaf rush	790		
			Saxifraga arguta	brook saxifrage	395		
			Senecio triangularis	arrow-leaf groundsel	584		
			Trollius laxus	American globeflower	113		
			Total		**4,421**	**5.25**	**8**
C	0.28	B	*Calamagrostis canadensis*	blue-joint reedgrass		1.4	
			Carex aquatilis	water sedge	497		
			Carex microptera	small-winged sedge	497		
			Carex utriculata	beaked sedge	497		
			Elymus glaucus	blue wild-rye		1.4	
			Glyceria elata	tall manna grass		1.4	
			Juncus ensifolius	dagger-leaf rush	636		
			Saxifraga arguta	brook saxifrage	227		
			Senecio triangularis	arrow-leaf groundsel	757		
			Trollius laxus	American globeflower	426		
			Total		**3,537**	**4.2**	**0**
D	0.1	B	*Calamagrostis canadensis*	blue-joint reedgrass		0.5	
			Carex aquatilis	water sedge	167		
			Carex microptera	small-winged sedge	167		
			Carex utriculata	beaked sedge	167		
			Elymus glaucus	blue wild-rye		0.5	
			Glyceria elata	tall manna grass		0.5	
			Juncus ensifolius	dagger-leaf rush	237		
			Saxifraga arguta	brook saxifrage	85		
			Senecio triangularis	arrow-leaf groundsel	282		
			Trollius laxus	American globeflower	158		
			Total		**1,263**	**1.5**	**0**
Total	**1.24**				**15,663**	**18.75**	**16**

3.2.6 Oversight

Specialists will be present as needed during wetland restoration/mitigation to evaluate specific activities and ensure goals are met. **Table 8** shows the specialists and the tasks for which they will be responsible.

Table 8: ***Oversight Personnel***

Specialist	Oversight Task
Hydrologist	• Channel restoration
Botanist/Revegetation Specialist	• Seed collection and planting • Planting and transplanting trees • Planting plugs
Soil Scientist	• Excavation and topographic adjustment
Oversight Contractor	• General oversight as provided in the consent decree

3.3 Success Criteria and Monitoring

3.3.1 Success Criteria

Restoration/mitigation will be considered successful if the acreage of each restored wetland site meets COE wetland criteria for hydrology, soils and vegetation, if each site meets the vegetation site criteria below, and if each site meets noxious weed criteria identified below.

Hydrologic Success will be achieved if wetland hydrology is present within each restoration site sufficient to maintain hydric soils and support wetland vegetation. Hydrologic success will also require that constructed channels be stable in wetlands that include channel reconstruction as described below.

Soil Success will be achieved if hydric soil conditions are present or appear to be forming and the soil is sufficiently stable to prevent erosion. Dark surface layers, reduced subsoil colors, and mottles are the most likely hydric soil indicators that will develop. Since hydric soil features may require long periods to form in this environment, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.

Vegetation Success will be achieved if wetland vegetation is dominant across each restoration site according to COE wetland criteria and:

- canopy coverage of all species meet the following goals:
  - 1st year after initial planting 25%
  - 2nd year after initial planting 50%
  - 3rd year after initial planting 75%
  - 4th year after initial planting 80%
  - 5th year after initial planting 80%
- noxious weeds are controlled to levels that are authorized by state law and the other undesired exotic plants have a canopy cover equal to or less than those occurring at reference sites.

The following concept of "dominance", as defined in the 1987 Army COE wetland delineation manual, will be employed during future routine wetland determinations in restored wetlands and reference areas: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest*

percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines)."

Channel Restoration Success will be evaluated in terms of revegetation success and bank stability success. Revegetation will be considered successful if noxious weeds are controlled to levels that are authorized by state law and the canopy coverage of all plants meet these criteria:

1st year after initial planting	25%
2nd year after initial planting	50%
3rd year after initial planting	75%
4th year after initial planting	80%
5th year after initial planting	80%

Bank stability success will be evaluated by identifying reference sites along adjacent, undisturbed portions of the channel. The percentage of eroding channel will be evaluated for both restoration channels and reference channels. For this purpose "eroding bank" will be defined as any bank greater than two feet in length that is more than 50% bare mineral soil and has no roots, surface vegetation, or other stabilizing structure (e.g. rock, woody debris) to inhibit erosion. Bank stability success will be achieved according to the following criteria:

Year 1	following restoration – No criteria
Year 2	following restoration – less than 50% of banks are unstable or channel is within 5% of the reference channel
Year 3	following restoration – less than 35% of banks are unstable or channel is within 5% of the reference channel
Years 4&5	following restoration – less than 25% of banks are unstable or channel is within 5% of the reference channel

3.3.2 Monitoring

This section describes hydrologic, soil and vegetation monitoring at representative restoration sites and at all mitigation sites. Reporting requirements for both the construction period and the five-year monitoring period are described in **Section 4.0 -** Reporting.

Detailed Wetland Monitoring
Detailed wetland monitoring will be conducted on representative restoration sites within each zone on East Pioneer Mountain and also at each mitigation site. Wetland restoration sites selected for detailed monitoring are:

Zone A - Site 4
Zone B - Sites 22, 30, 33
Zone C - Site 45, 48
Zone D - Site 39

Detailed wetland monitoring will include the restoration or mitigation site and the designated reference site in undisturbed wetland. Army Corps Routine Wetland Determination Forms will

be completed annually on all detailed wetland monitoring sites. Forms will be completed in late July or early August when vegetation has fully developed. Two to four permanent photo points will be established depending on site size to illustrate typical conditions. These permanent photo points will be marked on the site photo and metal stakes installed so the top is at ground level and can be re-located using a metal detector. If safety concerns allow, short wooden stakes may also be installed for easier relocation. Photo points will have GPS coordinates recorded using a resource grade GPS unit. Photos will also be taken from each end of vegetation transects looking back along each transect. Additional photos will be taken as needed to depict problems or deficiencies if performance standards are not being met. All monitoring components will be identified on site plans similar to those in **Appendix B** of this restoration/mitigation plan. Performance standards that are not being met will be described and contingencies identified that may be used to meet standards. Additional data collection is described below. Detailed monitoring will occur for three years. If performance criteria are met in three years, subsequent monitoring will be reduced to the "routine wetland monitoring" procedures discussed below.

Detailed Hydrologic Monitoring

Hydrologic monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year and additional data collection as described below.

In the first year, groundwater monitoring will occur every two weeks throughout the growing season (June-October unless snow depths or other weather conditions prevent access). In the subsequent four years, groundwater monitoring will occur every two weeks during the peak period of wetland hydrology (June-July unless snow depths or other weather conditions prevent access). If wetland soil and vegetation success is not achieved, these hydrologic data will also be useful in identifying necessary corrective actions.

Groundwater will be monitored by installing 2-4 monitoring wells per site to a depth of 3 feet consisting of 0.020 factory slotted 1-inch PVC. PVC will be cut at 2 inches above ground level. Measurements will be reported as depth to water below the ground surface. If soil conditions do not allow hand installation, a Geoprobe, backhoe or other mechanical monitoring well installation equipment will be used. A static water level tape will be used to measure depth to groundwater.

Detailed Soil Monitoring

Detailed soil monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year in late July or August. A minimum of five soil observations per site per visit will be made to directly verify hydric soil conditions, or to document hydric soil indicators such as dark surface layers, gleyed colors, and mottles. One observation will be described on the Army Corps form and notes on variation between the five observations will be described in the notes section.

Detailed Vegetation Monitoring

Vegetation monitoring will include completing Army Corps Routine Wetland Determination Forms for each site once each year and additional data collection described below.

Detailed vegetation data will be collected in late July or early August when the majority of wetland species are identifiable and have reached maximum canopy coverage. Dominant vegetation will be recorded on Army Corps Routine Wetland Determination forms according to Corps procedures. A complete species list will also be compiled at each site.

A permanent transect will be installed at each restoration and reference site that represents the range of topographic, hydrologic and soil conditions present. Transect ends will be marked with metal stakes installed so the top is at ground level and can be re-located using a metal detector. Transect ends will have GPS coordinates recorded using a resource grade GPS unit. Twenty micro-plots ($1/10^{th}$ meter) will be located along each transect centered at consistent intervals using a tape. The interval may be adjusted for individual sites depending on their size. Micro-plots will be relocated at the same spot in subsequent years. Coverage will be recorded at micro-plots for each individual plant species as well as for erosion control fabric, bare soil, rock and litter/wood. Average coverage will be calculated for all plants, for individual species and for erosion control fabric, bare soil, rock and litter/wood. Vertical photographs will be taken of the 1^{st}, 10^{th} and 20^{th} microplot frames along each transect to illustrate vegetation success and canopy coverage.

Routine Wetland Monitoring

Routine wetland monitoring will be conducted at sites where detailed monitoring is not required or after completion of the detailed monitoring period. Army Corps Routine Wetland Determination Forms will be completed annually in late July or early August when vegetation has fully developed. Two to four permanent photo points per site will be established depending on site size to illustrate typical conditions. These permanent photo points will be marked and recorded as described above. Notes will be recorded on the Corps form summarizing site conditions and noting any potential problems in meeting wetland criteria.

Detailed Channel Monitoring

Detailed stream channel monitoring will occur at sites 22, 48 and 68. At each restored channel, a reference channel will be identified in 2004 and submitted for EPA approval. Photo points will be established representing typical conditions along each channel (minimum of one per 100 feet of restored or reference channel). Once each year, during July or August, photo points will be marked and recorded as described above under wetland monitoring. At each photo point, channel vegetation will be monitored by ocular estimates of total plant cover, plant cover by species and cover of erosion control fabric, bare soil, rock and litter/wood. Monitoring will occur in July or August of each year. The length of bank will be recorded for possible erosion for the entire length of each restored channel and reference channel. Recommendations for corrective action will be recorded if problems are noted. If performance criteria are met in three years, subsequent monitoring will be reduced to the "routine channel monitoring" procedures discussed below.

Routine Channel Monitoring

Routine channel monitoring will occur on all of the lower energy sites. This does not include monitoring of energy dissipation at culverts in place. Two to four photo points will be established representing typical conditions along each restored channel. Photo points will be

marked and recorded as described above under routine wetland monitoring. Photos will be taken in a manner that vegetation success can be evaluated. Notes will be taken on any problems observed with channel restoration at each site.

3.4 Contingency Plans

Examples of contingency plans for hydrology, soil and vegetation concerns are presented below. Other contingency plans may be developed to address specific issues as restoration proceeds. If any modification or augmentation to restoration efforts is required, YMC will prepare a written contingency plan for approval by the oversight agencies before implementation.

Hydrologic Contingency Plans: The most likely reason for not meeting wetland hydrologic criteria is a lack of sufficient water. Should this occur, additional water may be supplied by further modifying the restored topography or other engineering or other solutions. If constructed stream channels become unstable, they may be stabilized by enlarging the channel or by increasing bank stability with rock, fabric, woody debris, or mature plant materials. Individual stability problems would be solved by site-specific designs.

Soil Contingency Plans: Soil contingency planning will not be required if hydrology and vegetation criteria are being met. The most likely reason for not meeting wetland soil criteria would relate to a lack of water with similar contingency plans as described under Hydrologic Contingency Plans. If soil performance standards related to erosion are not met, erosion control methods would be implemented to reduce water concentration and protect exposed soil. These methods may include water spreaders, erosion control fabric, mulch, or additional vegetation seeding/plantings.

Vegetation Contingency Plans: The most likely reasons for not meeting wetland vegetation criteria would include a lack of water, problems with seed germination and establishment, problems with early plug survival and problems with longer-term plant survival. Hydrologic conditions may need to be altered as described above.

If performance standards related to noxious weeds or other exotic plants are not met, control methods will be used to meet state law and other performance criteria. Mechanical removal will be used for small infestations. Chemical control may be used if infestations within restoration areas become large. Control methods may also be used on adjacent upland areas if necessary to prevent spread into restoration/mitigation sites.

Activities conducted to implement the restoration and mitigation plans, including contingency plans, will terminate when the success criteria are met.

4.0 REPORTING

4.1 Monthly Progress Reports

During the construction phase, monthly reports (including well data) will be provided to YMC and the EPA on the status of ongoing restoration/mitigation efforts. Reports will include photographic documentation of restoration work before, during and after activities take place.

4.2 Annual Monitoring Reports

YMC will provide annual reports on the status of restoration success by November 1 of each year. The monitoring periods for each site are set forth in **Table 9**. Each report will reference:

- The project by the official numeric identifier issued by the EPA.
- The individual or company responsible for completing the monitoring.
- The individual or company responsible for compiling the report.
- Maps similar to those in **Appendix B** illustrating the restoration/mitigation sites and reference wetlands with transect locations, monitoring well locations, photo locations and other spatial information.
- Photo-documentation from each photo point taken at established directions for year to year comparison.
- The methodologies used to gather data if different from those outlined in this plan.
- Data forms and summaries including Army Corps Routine Wetland Delineation forms and additional hydrologic, soil and vegetation data.
- A comparison of past and current conditions at each restoration/mitigation site in relation to prior condition and to performance criteria.
- Identification of contingency plan options for addressing performance criteria that are not met.

Table 9 lists monitoring and reporting applicable to each site.

Table 9: ***Monitoring and Reporting for Each Site[1]***

Site	Restoration or Mitigation Area Size (FT^2)	Detailed Monitoring	Routine Monitoring	Progress Reports[2]	Annual Report*
4	9,197	3 years	2 years	2004-2005	2005-2009
10	6,810		5 years	2004-2005	2005-2009
15	90		5 years	2004-2005	2005-2009
17	4,897		5 years	2004-2005	2005-2009
18	1,730		5 years	2004-2005	2005-2009
22	14,080	3 years	2 years	2004-2005	2005-2009
23	459		5 years	2004-2005	2005-2009
24	50		5 years	2004-2005	2005-2009
29	330		5 years	2004-2005	2005-2009
30	5,043	3 years	2 years	2004-2005	2005-2009
32	165		5 years	2004-2005	2005-2009
33	11,690	3 years	2 years	2004-2005	2005-2009
34	2,025		5 years	2004-2005	2005-2009
39	1,344	3 years	2 years	2004-2005	2005-2009
40	1,955		5 years	2004-2005	2005-2009
44	2,370		5 years	2004-2005	2005-2009
45	2,300	3 years	2 years	2004-2005	2005-2009
46	200		5 years	2004-2005	2005-2009
47	400		5 years	2004-2005	2005-2009
48	1,470	3 years	2 years	2004-2005	2005-2009
58	248		5 years	2004-2005	2005-2009
59	102		5 years	2004-2005	2005-2009
60	45		5 years	2004-2005	2005-2009
61	45		5 years	2004-2005	2005-2009
68	6,171		5 years	2004-2005	2005-2009
70	860		5 years	2004-2005	2005-2009
71	114		5 years	2004-2005	2005-2009
73	49		5 years	2004-2005	2005-2009
74	228		5 years	2004-2005	2005-2009
75	207		5 years	2004-2005	2005-2009
76	60		5 years	2004-2005	2005-2009
77	20		5 years	2004-2005	2005-2009
78	1,530		5 years	2004-2005	2005-2009
81	540		5 years	2004-2005	2005-2009
1007	4,487		5 years	2004-2005	2005-2009
1012	610		5 years	2004-2005	2005-2009
1013	610		5 years	2004-2005	2005-2009
1014	741		5 years	2004-2005	2005-2009
1027	1,394		5 years	2004-2005	2005-2009
A-M	22,486	3 years	2 years	2004-2005	2005-2009
B-M	15,055	3 years	2 years	2004-2005	2005-2009
C-M	12.108	3 years	2 years	2004-2005	2005-2009
D-M	4,522	3 years	2 years	2004-2005	2005-2009

1 - Monitoring and reporting as indicated or until success criteria is met.
2 - After 2004 YMC will monitor and report as outlined in Section 4.2. Best efforts will be made to complete topographic construction work on all restoration sites on Pioneer Mountain in 2004. However it is understood that work on some of the sites on Pioneer Mountain may not be completed in 2004. A 2005 date will apply to sites where topographic construction work is not completed in 2004.

Table 9a: ***Monitoring and Reporting for Each Site[1] (by zone)***

Site	Zone	Restoration or Mitigation Area Size (FT^2)	Detailed Monitoring	Routine Monitoring	Progress Reports[2]	Annual Report*
4	A	9,197	3 years	2 years	2004-2005	2005-2009
10	A	6,810		5 years	2004-2005	2005-2009
15	B	90		5 years	2004-2005	2005-2009
17	B	4,897		5 years	2004-2005	2005-2009
18	B	1,730		5 years	2004-2005	2005-2009
22	B	14,080	3 years	2 years	2004-2005	2005-2009
23	B	459		5 years	2004-2005	2005-2009
24	B	50		5 years	2004-2005	2005-2009
29	B	330		5 years	2004-2005	2005-2009
30	B	5,043	3 years	2 years	2004-2005	2005-2009
32	B	165		5 years	2004-2005	2005-2009
33	B	11,690	3 years	2 years	2004-2005	2005-2009
81	B	540		5 years	2004-2005	2005-2009
1007	B	4,487		5 years	2004-2005	2005-2009
1027	B	1,394		5 years	2004-2005	2005-2009
C-M	B	12,108	3 years	2 years	2004-2005	2005-2009
D-M	B	4,522	3 years	2 years	2004-2005	2005-2009
34	C	2,025		5 years	2004-2005	2005-2009
44	C	2,370		5 years	2004-2005	2005-2009
45	C	2,300	3 years	2 years	2004-2005	2005-2009
46	C	200		5 years	2004-2005	2005-2009
47	C	400		5 years	2004-2005	2005-2009
48	C	1,470	3 years	2 years	2004-2005	2005-2009
1012	C	610		5 years	2004-2005	2005-2009
1013	C	610		5 years	2004-2005	2005-2009
1014	C	741		5 years	2004-2005	2005-2009
A-M	C	22,486	3 years	2 years	2004-2005	2005-2009
B-M	C	15,055	3 years	2 years	2004-2005	2005-2009
39	D	1,344	3 years	2 years	2004-2005	2005-2009
40	D	1,955		5 years	2004-2005	2005-2009
58	E	248		5 years	2004-2005	2005-2009
59	E	102		5 years	2004-2005	2005-2009
60	E	45		5 years	2004-2005	2005-2009
61	E	45		5 years	2004-2005	2005-2009
73	E	49		5 years	2004-2005	2005-2009
74	E	228		5 years	2004-2005	2005-2009
75	E	207		5 years	2004-2005	2005-2009
76	E	60		5 years	2004-2005	2005-2009
77	E	20		5 years	2004-2005	2005-2009
78	E	1,530		5 years	2004-2005	2005-2009
68	F	6,171		5 years	2004-2005	2005-2009
70	F	860		5 years	2004-2005	2005-2009
71	F	114		5 years	2004-2005	2005-2009

1 - Monitoring and reporting as indicated or until success criteria is met.
2 - After 2004 YMC will monitor and report as outlined in Section 4.2. Best efforts will be made to complete topographic construction work on all restoration sites on Pioneer Mountain in 2004. However it is understood that work on some of the sites on Pioneer Mountain may not be completed in 2004. A 2005 date will apply to sites where topographic construction work is not completed in 2004.

5.0 IMPLEMENTATION SCHEDULE

Table 10 lists tasks and anticipated completion dates for the first year's effort.

Table 10: ***Proposed Implementation Schedule for 2004-2005***

Task	Anticipated Completion Date
Seed collection	Completed in July-August 2003
Contract plug growing	2004 - 2005
Submit proposed channel reference sites to EPA	August 15, 2004
Topographic adjustments, installation of water spreaders, outlets, erosion control features	July – September 2004
Vegetation seeding of species planted as seed	As topographic adjustment is completed
Install Groundwater Monitors	By September 30,2004
Vegetation planting of plugs and trees	Before August 1, 2004 or during Spring 2005
Reporting – progress updates on restoration/mitigation	1st and 15th of each month, August-October 2004
Reporting – special circumstances, such as performance issues	As needed
Monitoring	August 2005
Reporting – annual monitoring report	November 2005 or 2006

6.0 DEADLINES FOR COMPLIANCE WITH CONSENT DECREE

The work described in this Restoration Plan is being undertaken pursuant to a Consent Decree entered into between the United States and various entities connected to the Yellowstone Mountain Club property. All disputes arising from this section may be subject to dispute resolution under the Consent Decree. Table 11 lists deadlines for the consent decree.

Table 11: ***Deadlines for Consent Decree***

Section	Description of Work	Deadline	Comments
3.3.1	Hydrologic success for wetland restoration sites	Report due November 1, 2005 (and 2006) [1] and November 1 of each year until the end of monitoring for each site	
3.3.1	Soil success for wetland restoration sites	Report due November 1, 2005 (and 2006) [2] and November 1 of each year until the end of monitoring for each site	Failure to meet soil success criteria will not be considered a failure if hydrologic and vegetative success are being achieved
3.3.1	Vegetation success for wetland restoration sites	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	
3.3.1	Hydrologic success for wetland mitigation sites	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	
3.3.1	Soil success for wetland mitigation sites	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	Soil success will not be a violation if hydrologic and vegetative success are being achieved
3.3.1	Vegetation success for wetland mitigation sites	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	
3.3.1	Vegetation success for channels	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	
3.3.1	Bank stability success for channels	Report due November 1, 2006 (and 2007) [2] and November 1 of each year until the end of monitoring for each site	

[1] The 2005 date applies to sites or work completed in 2004; the 2006 date applies to work completed in 2005.
[2] The 2006 date applies to sites or work completed in 2004; the 2007 date applies to work completed in 2005.

Table 11: ***Deadlines for Consent Decree*** *(continued)*

Section	Description of Work	Deadline	Comments
4.1	Progress updates	Beginning August 1, 2004 and then on the 1st and 15th of each month until construction and planting are complete. No reports will be provided during months when there is no activity.	This deadline applies to those sites for which construction begins in 2004; for sites begun in 2005, monthly reports will provided August 1, 2005 through October 1, 2005 or until these activities are completed
4.2	Annual monitoring reports	November 1 of each year through the end of the monitoring period for each site.	Monitoring will commence in the year of construction for individual sites; sites for which construction is complete and monitoring is commencing will be reported in monthly reports for that year.

7.0 Ongoing Activities

Notwithstanding paragraph 23 of the Consent Decree, five years after completion of the work described in this Appendix, and only as permitted by applicable law, YMC shall not be prohibited from cutting vegetation in the restoration and mitigation areas to the minimum extent necessary to prevent unanticipated interference with skiing on overlying or immediately adjacent ski runs as currently configured. YMC shall provide EPA with two working days' notice prior to undertaking cutting of vegetation pursuant to this provision. Further, it is acknowledged that turning off or reducing Pioneer Mountain irrigation in any location shall not be considered draining or dewatering as used in Paragraph 23. This Paragraph will survive termination of the Consent Decree.

8.0 REFERENCES

Chin, A. 1989. Step pool in stream channels. Progress in Physical Geography. V. 13, p. 391-407.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S.D.I. Fish and Wildlife Services. Washington, D.C.

Denbow, J., D. Klemments, D. Rothman, E. Garbisch, C. Bartoulds, M. Kraus, D. MacLean, G. Thunhorst. 1996. Guidelines for the Development of Wetland Replacement Areas. Report 379: Transportation Research Board, National Research Council. pp 41-78.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Wetlands Research Program Technical Report Y-87-1. Department of the Army. Vicksburg, MS.

Gish, Jim. 2003. Personal communication about sedge, grass and other plant materials used for wetland restoration March 14, 2003. Jim is an employee of Granite Seed.

Hitchcock, C. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle. 730p.

HDR Engineering Inc. 2002. Wetland Restoration Plan: Proposed Golf Course, Yellowstone Mountain Club. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

HDR Engineering Inc. 2002. Revised Wetland Restoration Plan: Proposed Golf Course, Yellowstone Mountain Club. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

Henry, Christophe P. and Claude Amoros. 1995. Restoration Ecology of Riverine Wetlands III. Vegetation Survey and Monitoring Optimization. October 1995. 4 pp.

Holzhauser, Russ. 2003. Personal communication about sedge, grass and other plant materials used for wetland restoration March 31, 2003. Russ is an employee of Western Native Seed.

Hook, P. 2003. Telephone conversation concerning the 2001 research paper with J. Klausmann and the use of seeding as a wetland restoration technique for sedges, grasses and forbs. February 20, 2003.

Klausmann, J. and P. Hook. 2001. Comparison of Seven Methods for Revegetating Sedge-Dominated Rocky Mountain Wetland. Teton County, WY and USEPA. 48p.

Klausmann, J. 2003. Telephone conversation concerning the 2001 research paper with P. Hook and the use of seeding as a wetland restoration technique for sedges, grasses and forbs. March 21, 2003.

Kolka R. K., E. A. Nelson, C. C. Trettin. 2000. Conceptual Assessment Framework for Forested Wetland Restoration: The Pen Branch Experience. Ecological Engineering 15. pp S17-S21.

Land & Water Consulting Inc. 2003a. East Pioneer Mountain 2002 Supplemental Wetland Evaluation. 21 pages plus Appendices.

Land & Water Consulting Inc. 2003b. East Pioneer Mountain Areas of Concern. 15 pages plus Appendices.

Milner, G. 2003. Wetland Mitigation Strategies for Success. Land and Water, January/February 2003. pp. 56-63.

Mitsch William J., Renee F. Wilson. 1996. Improving the Success of Wetland Creation and Restoration with Know-How, Time, and Self-Design. Ecological Applications. Vol. 6, No. 1. pp 77-83.

Mitsch, William J., Xinyuan Wu, Robert W. Nairn. 1998. Creating and Restoring Wetlands. BioScience Vol. 48 No. 12. December 1998. pp 1019-1030

Mitsch, J. William, James G. Gosselink. 2000. Wetlands Third Edition: Chapter19, Wetland Creation and Restoration. June 2000. pp. 653-686

Montgomery D.R. and Buffington. J.M. 1997. Channel-reach morphology in mountain drainage basins. Geol. Soc. Ameri. Bulletin, v. 109, no. 5, p. 596-611.

Natural Resources Conservation Service. 2002. Hydric soils of the United States – introduction. Downloaded from internet 6/26/2002. http://www.statlab.iastate.edu/soils/hydric/intro.html.

Nesser, J.A., Ford, G.L., Maynard, C.L., and D.S. Page-Dumroese. 1997. Ecological units of the Northern Region: subsections. General Technical Report INT-GTR-369. U.S.D.A. Forest Service. Ogden, UT. 88 pp.

Ossinger, M. 1999. Success Standards for Wetland Mitigation Projects - a Guideline. Washington State Dept. of Transportation. 31 pp.

Payne, G.F. 1973. Vegetative rangeland types in Montana. Montana Agricultural Experiment Station, Montana State University. Bozeman, MT.

Pierce, Gary J. 1996. Wetland Mitigation, Wetland Training Institute (presented by Wetland Training Institute, Red Lodge, MT) June 17-21, 1996. 19 pp.

Reed, P.B. 1988. National list of plant species that occur in wetlands: North West (Region 9). Biological Report 88(26.9). May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs. CO

Smith, R.D., A. Ammann, C. Bartoldus, and M.M. Brinson. 1995. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices. Wetland Research Program Technical Report WRP-DE-9. U.S. Army Corps of Engineers Waterways Experiment Station. Vicksburg, MS.

Society of Wetland Scientists. 2000a. Position Paper on Performance Standards for Wetland Restoration and Creation. 4 pp.

Society of Wetland Scientists. 2000b. Position Paper on the Definition of Wetland Restoration. 8/6/2000. 3 pp.

Soil Conservation Service. 1989. Soil survey of Madison County Area, MT. Bozeman, MT.

Steinle, A. 2002. Email to Jeff Berglund, Land & Water Consulting, Inc. regarding applicable wetland plant lists in Montana. Friday, May 10, 2002. U.S. Army Corps of Engineers, Helena, MT.

Streever, B., J. Zedler. 2000. To Plant or Not to Plant. March 2000. BioScience. Vol. 50:3, pp. 188-190.

Thomas, D.B., S.R. Abt, R.A. Mussetter, and M.D. Harvey. 2000. A design procedure for sizing step-pool structures. Joint Conference on Water Resources Engineering and Water Resources Planning & Management. American Society of Civil Engineers. Minneapolis, MN.

U.S. Army Corps of Engineers. 1991a. Hydraulic design of flood control channels. EM1110-2-1601.

U.S. Army Corps of Engineers. 1991b. Questions & answers on 1987 Corps of Engineers manual. October 7, 1991

U.S. Army Corps of Engineers. 1991c. Habitat Mitigation and Monitoring Proposal Guidelines. San Francisco District. November 1991. 11p.

U.S. Army Corps of Engineers. 1992. CECW-OR – March 6, 1992 memorandum: clarification and interpretation of the 1987 manual.

U.S. Army Corps of Engineers. 2001a. Omaha Regulatory Definitions. Terminology and Definitions, Goldsberry, May 2001. Downloaded from http://www.nwo.usace.army.mil/html/od-tl/textsearch/GUIDANCE/Definitions%20Omaha%20Regulatory%20May01.html 2/20/2003. 31 pp.

U.S. Army Corps of Engineers. 2001b. Jurisdictional determinations case specific questions and answers (SWANCC case studies, questions and answers, Goldsberry, (Q&A) May-2001). Omaha, NE. Downloaded from http://www.nwo.usace.army.mil/html/od-tl/textsearch/SWANCC/SWANCC%20Omaha%20JD%20Case%20Studies%20May01.html on February 19, 2003. 8 pp.

U.S. Army Corps of Engineers. 2002a. National Wetlands Mitigation Action Plan. December 24, 2002. 5 pp & 7 pp.

U.S. Army Corps of Engineers. 2002b. Regulatory Guidance Letter: Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. December 4, 2002. No. 02-2 16 pp.

U.S. Army Corps of Engineers: Sacramento District Regulatory Program. 1996. Habitat Mitigation and Monitoring Proposal Guidelines. Downloaded from http://www.spk.usace.army.mil/cespk-co/regulatory/habmitmon.html 2/11/2003. 30 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1992a. Design and Construction Requirements for Establishing Herbaceous Wetland Vegetation. May 1993. WRP Technical Note VN-EM-3.1. 4 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1992b. Wetlands Engineering: Design Sequence for Wetlands Restoration and Establishment. May 1992. WRP Technical Note WG-RS-3.1. 4 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993a. Wetlands Mitigation Evaluation: A Bibliography. January 1993. WRP Technical Note WG-EV-6.1. 3 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993b. Baseline Site Assessments for Wetland Vegetation Establishment. August 1993. WRP Technical Note VN-EV-2.1. 6 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1993c. Basic Considerations for Vegetative Design of Wetlands. August 1993. WRP Technical Note VN-EM-3.2. 5 pp.

U.S. Army Corps of Engineers: Wetlands Research Program (WRP). 1999. Examples of Performance Standards for Wetland Creation and Restoration in Section 404 Permits and an Approach to Developing Performance Standards. January 1999. WRP Technical Note WG-RS-3.3 14 pp. 5 pp.

U.S. Environmental Protection Agency. 1993. Restoring and Creating Wetlands: A Handbook for the Rocky Mountain West. EPA908-B-95-900. January 1993. 42 pp.

Wetlands West. 2000. Wetland delineation for the proposed Yellowstone Mountain Club, Golf Course. April 2001. Prepared for: Yellowstone Mountain Club, P.O. Box 161097, Big Sky, MT 59716. Bozeman, MT.

Western Regional Climate Center. 2003. Length of "freeze free" season probabilities for Big Sky 3S, Montana (240775). Downloaded from internet 1/23/2003. http://www.wrcc.dri.edu/cgi-bin/cliTFrezD.pl?mtbig3.

Zedler, J. B. 2000. Progress in Wetland Restoration Ecology. Tree Vol.15, no. 10. October 2000. pp. 402-407.

APPENDIX A

LAND & WATER

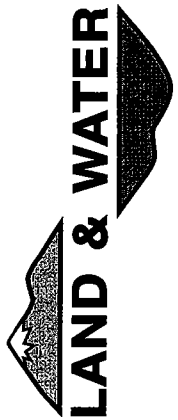
Appendix A

MAP OF EAST PIONEER MOUNTAIN RESTORATION AND MITIGATION SITES AND LIMITS OF INVESTIGATION

Yellowstone Club East Pioneer Mountain
Wetland Restoration and Mitigation Plan

LAND & WATER

APPENDIX B



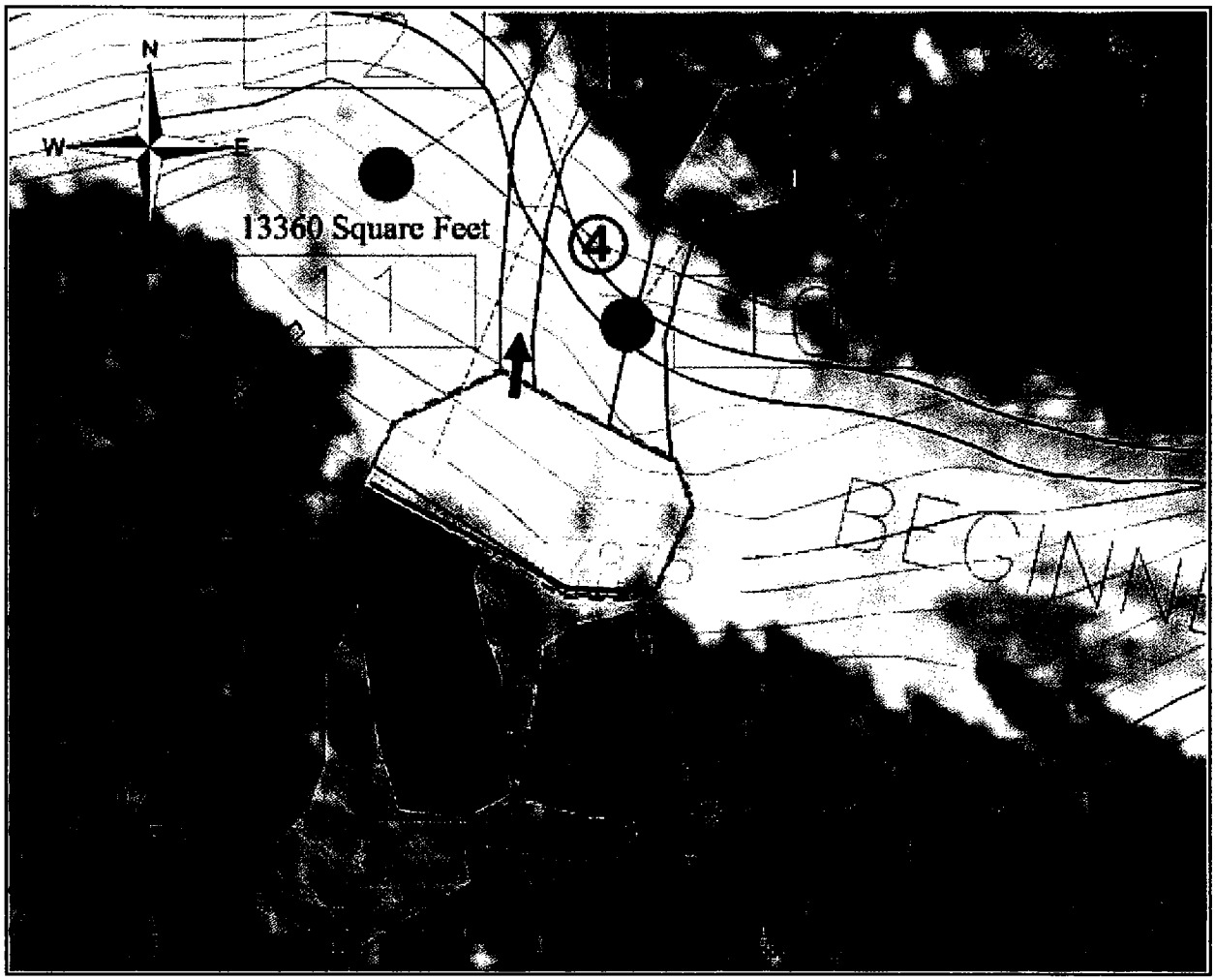
Appendix B

RESTORATION/MITIGATION SITE DESCRIPTIONS

Yellowstone Club East Pioneer Mountain
Wetland Restoration and Mitigation Plan

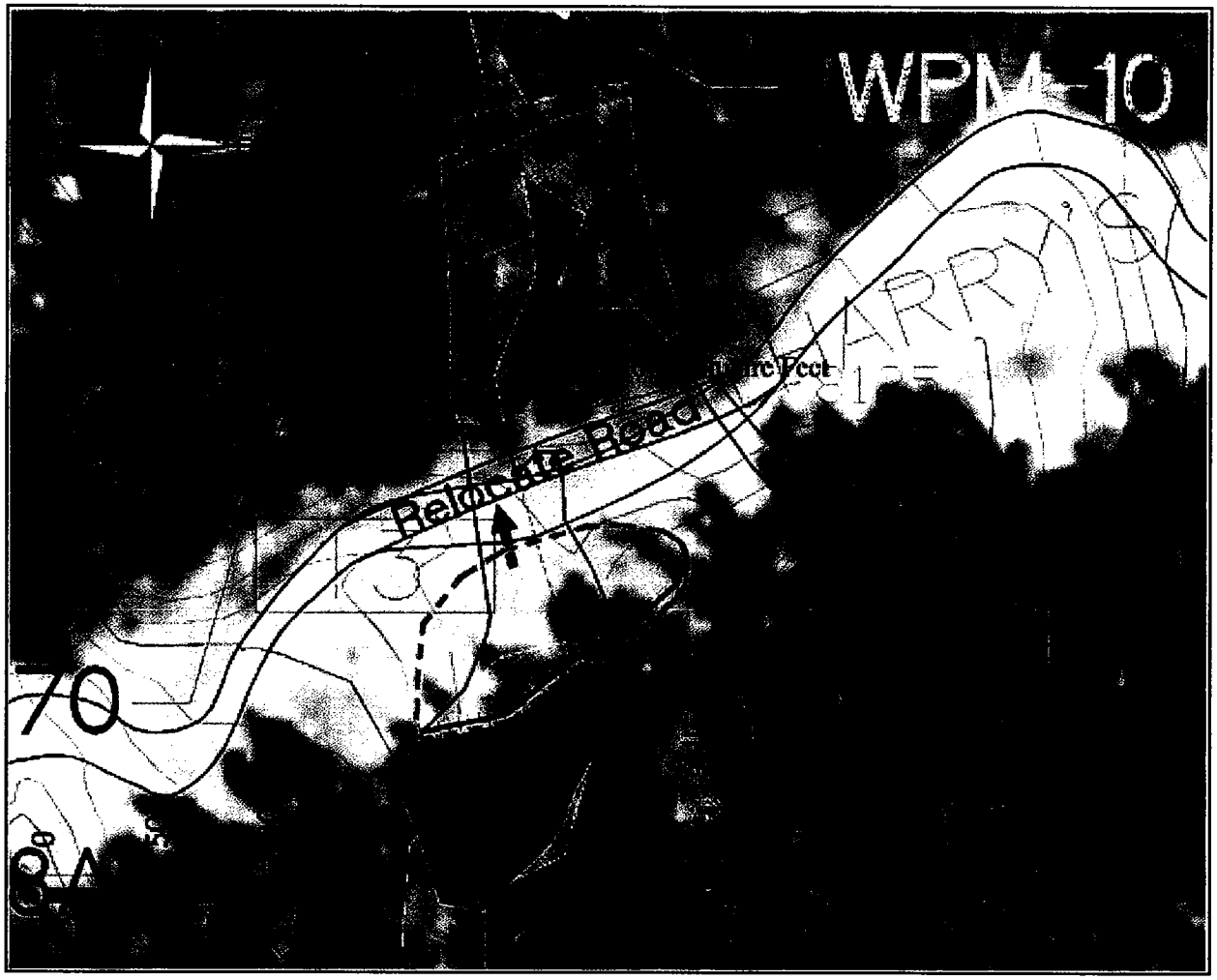
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	4
Culvert No:	10,11 & 12
Wetland No. Above:	WPM-10
Wetland No. Below:	WPM-10 / WPM-11
Watershed:	Dream Catcher
Ski Run / Road:	Beginners Luck
Quadrant:	C-2
Zone:	A
Area of Disturbance:	13,360 square feet (0.31 acre) – Restored area will be 9197 square feet (0.21 acre)
Restoration Plan:	Restoration will include shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the restoration area, installing logs to promote even water distribution, shortening Culvert 11 and constructing an outlet into it from the restored wetland, installing energy dissipation at the culvert outlet and then revegetating. Culverts 10 and 12, which have no exposed inlets, will be left in place. This site will be monitored as representing Zone A with monitoring wells, vegetation transects and photopoints at this site and an adjacent reference area.



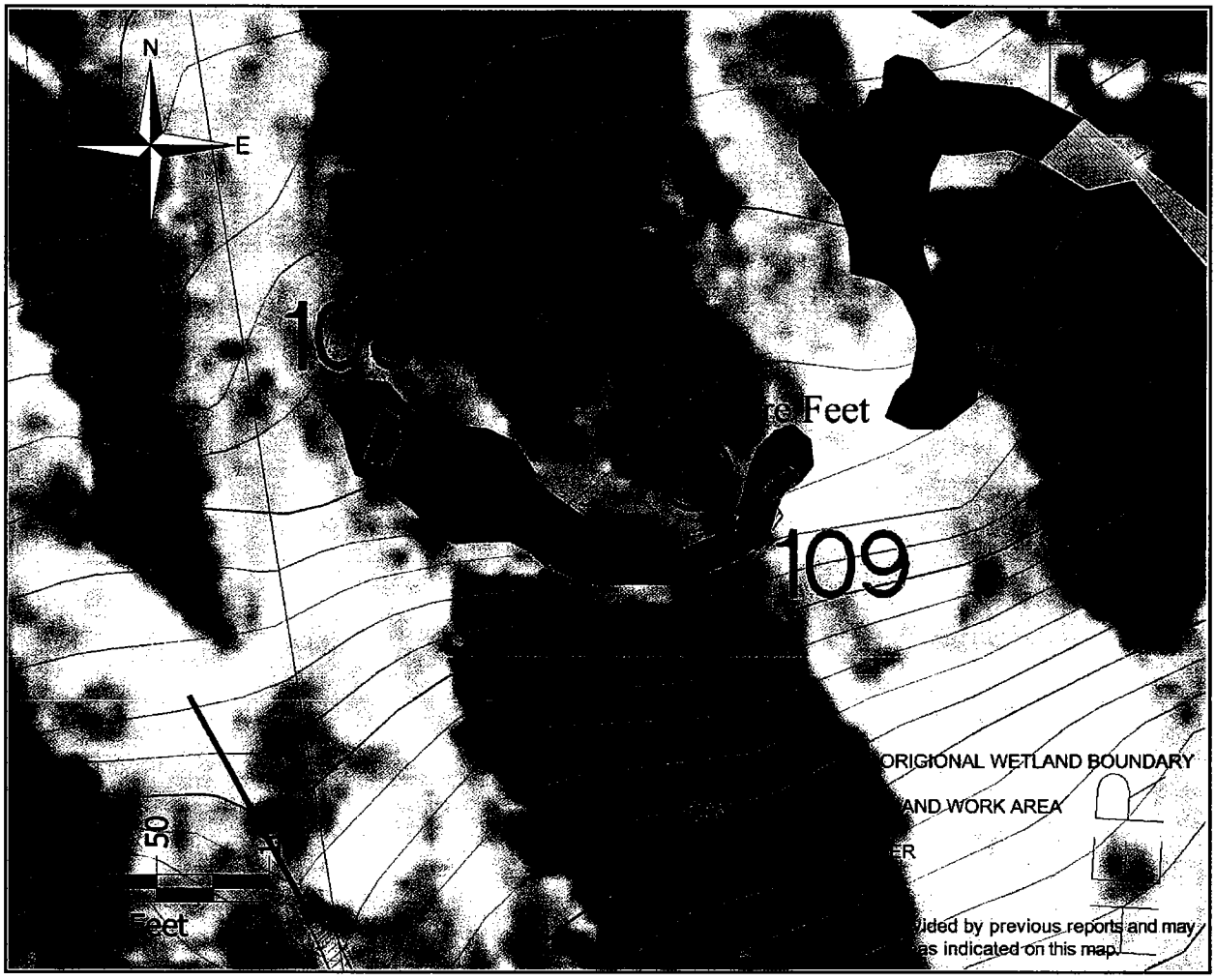
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	10
Culvert No:	13
Wetland No. Above:	WPM-13
Wetland No. Below:	WPM-10
Watershed:	Dream Catcher
Ski Run / Road:	Harry's Water Road
Quadrant:	B-3
Zone:	A
Area of Disturbance:	6810 square feet (0.16 acre)
Restoration Plan:	Harry's Water Road will be relocated to follow the north side of the roadbed. Culvert 13 will be removed and a rock-lined driveable dip installed to connect Wetland /WPM-10 with Wetland 181. Restoration will include shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the restoration area, installing logs to promote even water distribution and then revegetating.



LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	15
Culvert No:	None
Wetland No. Above:	109
Wetland No. Below:	108
Watershed:	Dream Catcher
Ski Run:	Lake Lift / Dream Catcher
Quadrant:	B-6
Zone:	B
Area of Disturbance:	90 square feet (0.002 acre)
Restoration Plan:	Restoration will include removing fill averaging approximately 1 foot deep across the 90 square foot area, smoothing along the contours to eliminate high and low spots and then revegetating. The 90 square foot area is in the northeast portion of wetland 109.



LAND & WATER

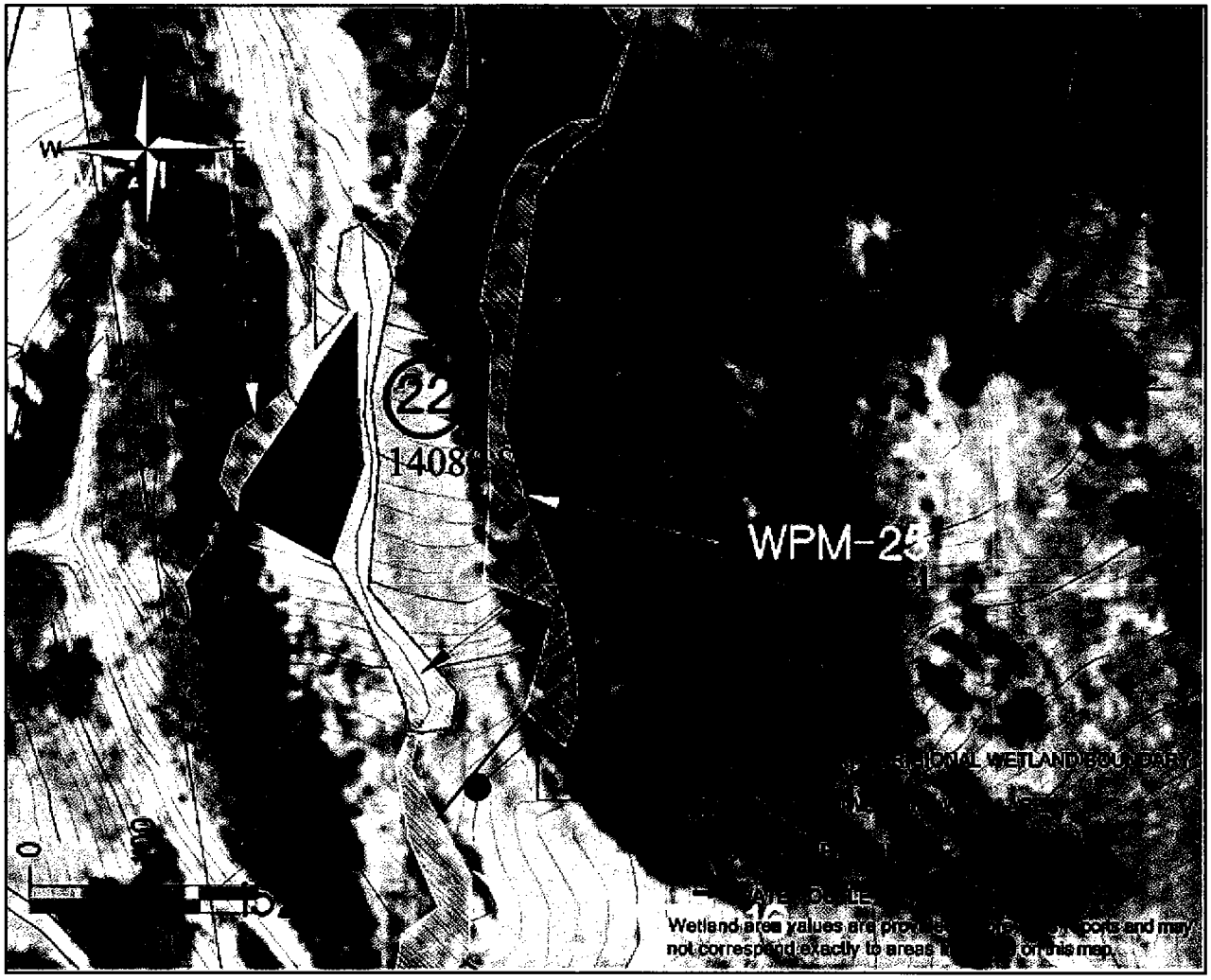
Pioneer Mountain Restoration Site	
LWC Site No:	17
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	114
Watershed:	Dream Catcher
Ski Run / Lift:	Lake Lift
Quadrant:	B-6
Zone:	B
Area of Disturbance:	4897 square feet (0.11 acre)
Restoration Plan:	Restoration will include shallow excavating (<6 inches) to define the wetland area which will include both the two portions noted in the AOC report and the upland area between, smoothing the wetland area along the contour to eliminate high and low spots, installing water spreaders at the top and middle of the restoration area, installing logs to promote even water distribution, constructing an outlet and then revegetating. The result will be an area larger than the original disturbance area of 2570 square feet (.06 acre).

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	18
Culvert No:	None
Wetland No. Above:	113
Wetland No. Below:	None
HGM Class:	Slope / Riverine
Cowardin Class:	Emergent / Forested
Watershed:	Dream Catcher
Ski Run:	Lake Lift
Quadrant:	B-6
Zone:	B
Area of Disturbance:	1730 square feet (0.04 acre)
Restoration Plan:	This steep, wet site presents stability and erosion issues and there is a significant amount of wetland vegetation both remnant from pre-construction and that has invaded since construction. Restoration at this site will include the planting of 433 nursery grown plugs and seeding of 0.6 lbs. of grass species to accelerate plant development. Refer to Table 6 for detailed list of species for this zone. No topographic adjustment will be made due to steepness, stability and erosion issues.

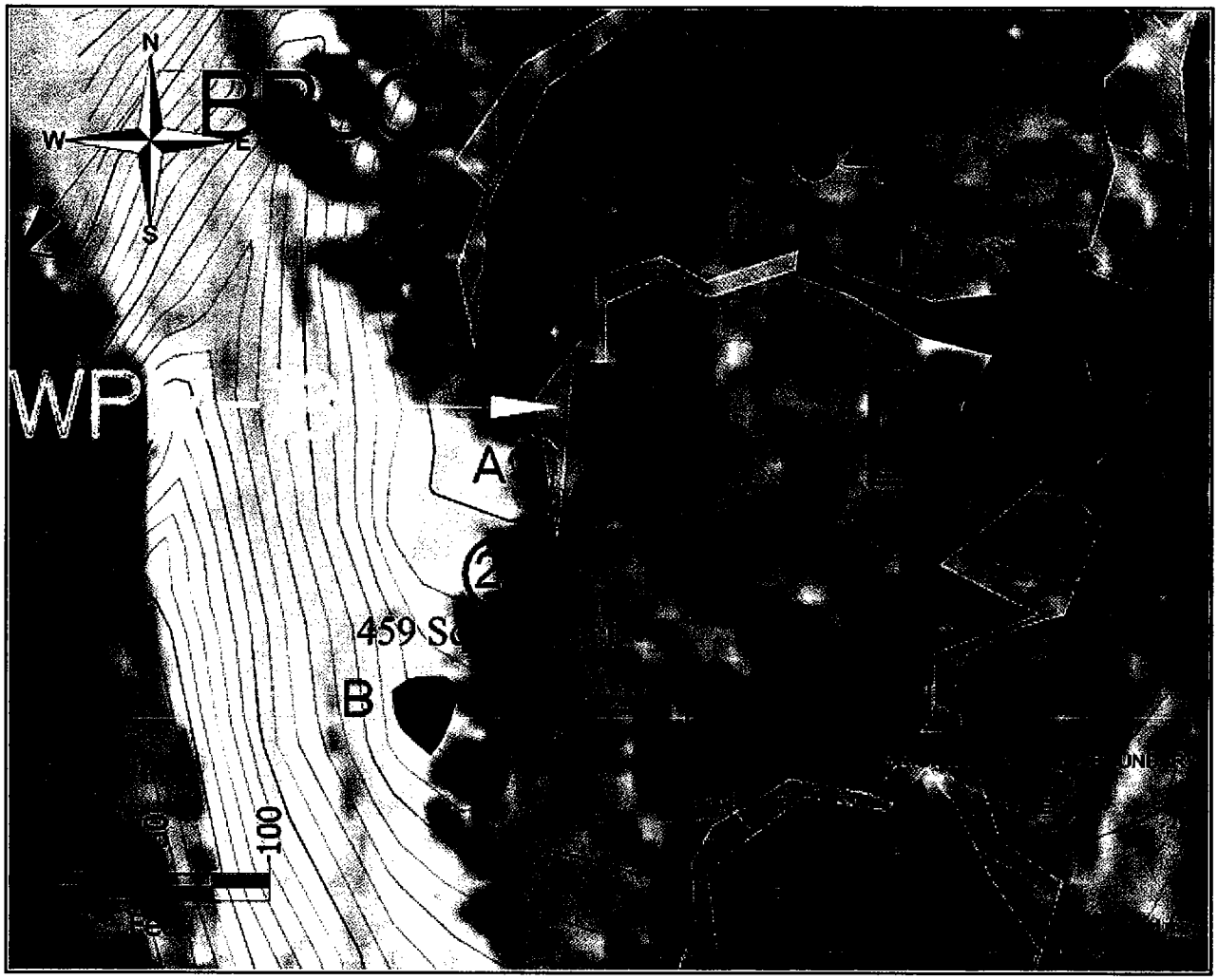
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	22
Culvert No:	None
Wetland No. Above:	WPM-16
Wetland No. Below:	WPM-16
Watershed:	Dream Catcher
Ski Run:	Dream Catcher
Quadrant:	B-5
Zone:	B
Area of Disturbance:	14080 square feet (0.32 acre)
Restoration Plan:	At this site, the Dream Catcher run intersects Wetlands WPM-16 and WPM-21. The upper portion of this site still maintains its wetland character and is not shown as an impact. Restoration at this site will include a high-energy channel down the middle of former WPM-16 with wetland across the remainder of the site. The wetland portion will be regraded to remove gullies that have developed since disturbance. The wetland area will be shaped to be slightly lower than the adjacent uplands, slopes will be smoothed along the contour, logs will be installed to promote even water distribution and the site will be revegetated.



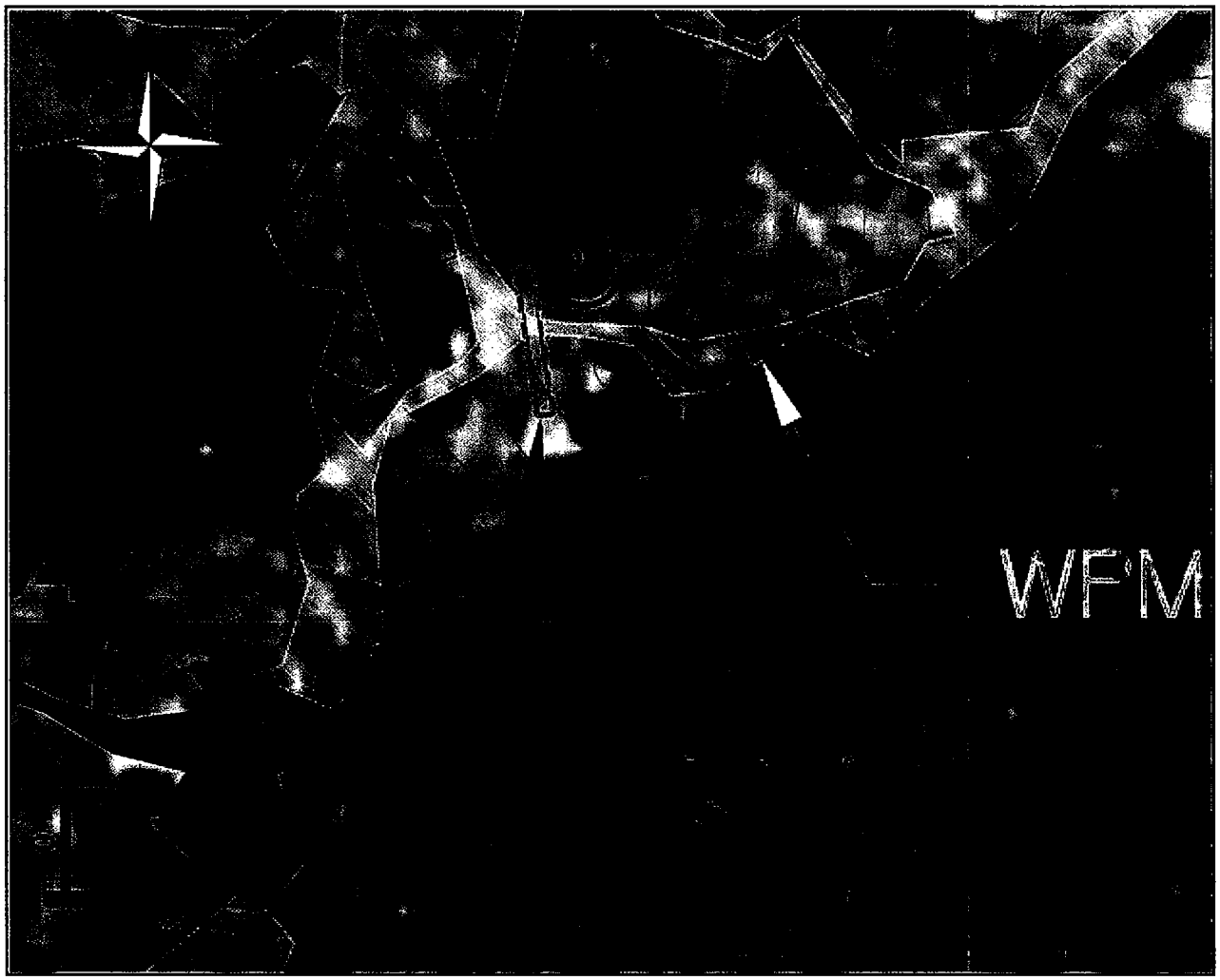
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	23
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	WPM-18
Watershed:	Dream Catcher
Ski Run:	Dream Catcher
Quadrant:	B-4
Zone:	B
Area of Disturbance:	459 square feet (0.001 acre)
Restoration Plan:	WPM-18 is located on the east side of Dream Catcher run. Restoration will include removing a small amount of fill in WPM-18, smoothing along the contours and then revegetating.



LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	24
Culvert No:	None
Wetland No. Above:	WPM-16
Wetland No. Below:	WPM-16
Watershed:	Dream Catcher
Ski Run:	None
Quadrant:	B-4
Zone:	B
Area of Disturbance:	50 square feet (estimated)
Restoration Plan:	At this site, Wetland WPM-24 has been altered by the construction of a berm within the channel of this wetland waterway. This site also has wetland impacts from equipment use. No acreage was measured for this disturbance, we have estimated it at 50 square feet. Restoration will include removing a small amount of fill in WPM-24 (the berm), smoothing along the contours and then revegetating.

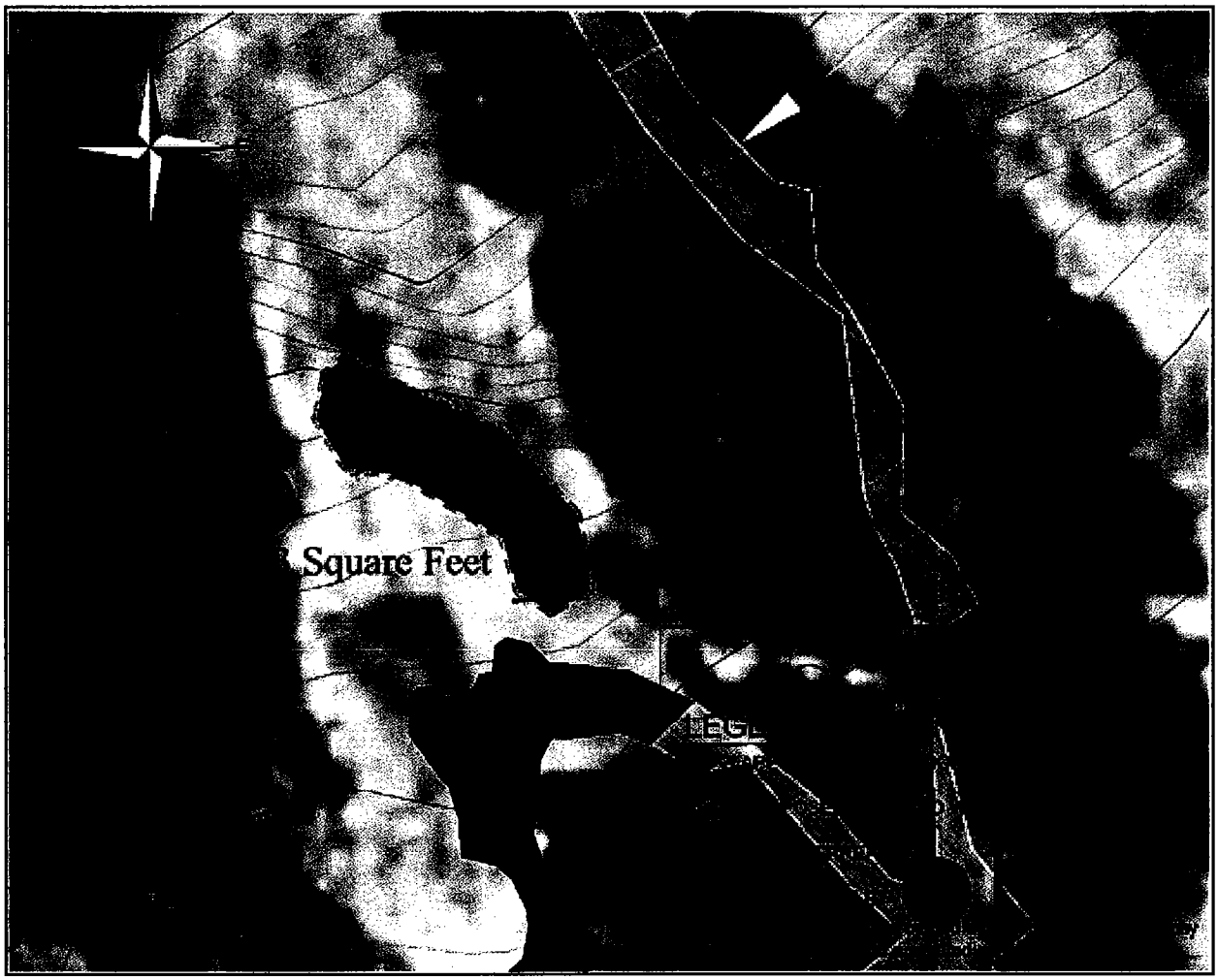


LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	29
Culvert No:	26
Wetland No. Above:	WPM-26
Wetland No. Below:	WPM-26
Watershed:	Dream Catcher
Ski Run:	None
Quadrant:	B/C-6
Zone:	B
Area of Disturbance:	330 square feet (0.007 acre)
Restoration Plan:	At this site, the Wetland WPM-26 is intersected by a logging road east of Dream Catcher run. Culvert 26 connects the two portions of WPM-26. Restoration will include removing Culvert 26 and associated fill, smoothing along the contours and then revegetating. The site will be restored as a wetland and not a channel.

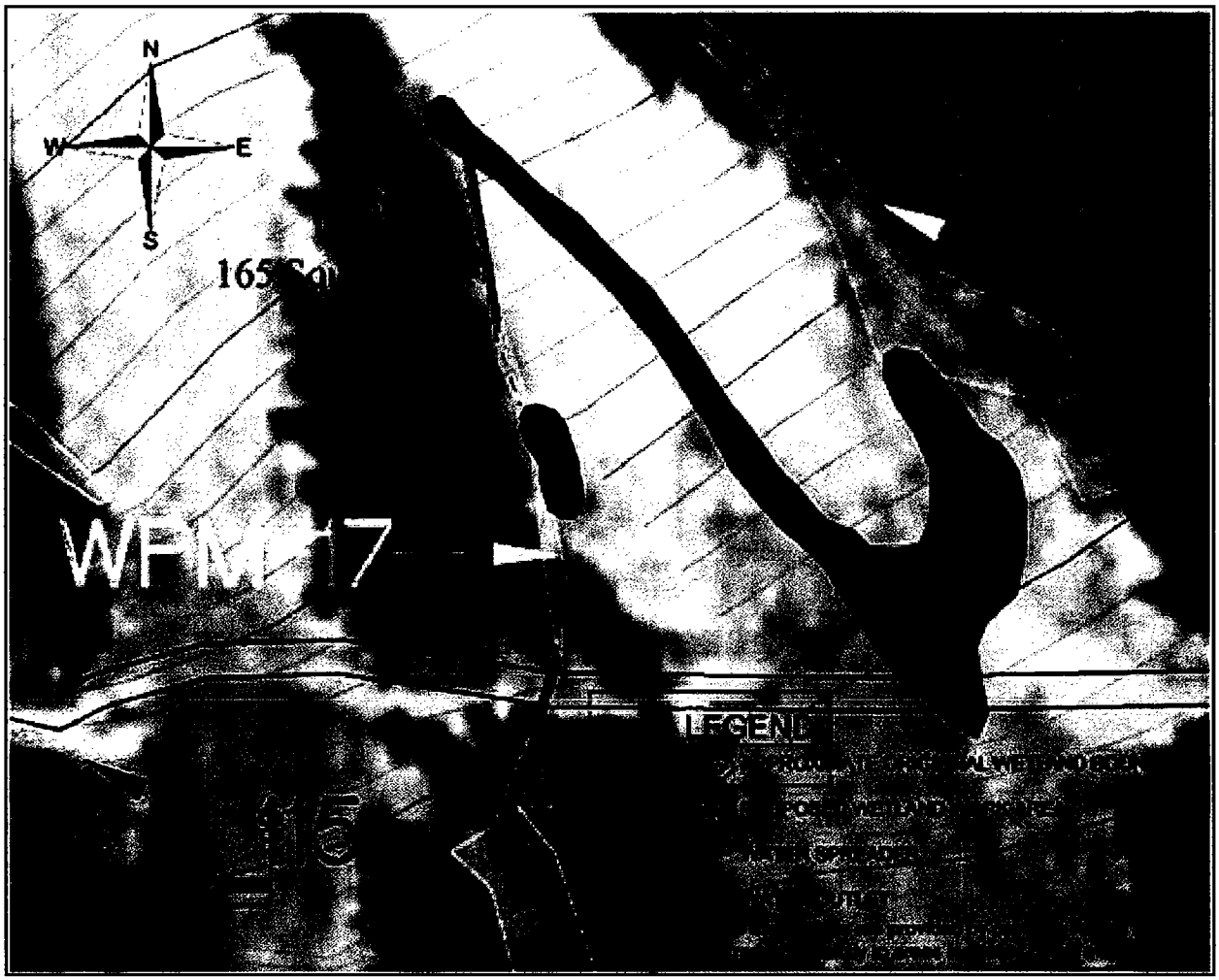
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	30
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	None
Watershed:	Dream Catcher
Ski Run:	Dream Catcher
Quadrant:	B-6
Zone:	B
Area of Disturbance:	5043 square feet (0.12 acre)
Restoration Plan:	Restoration will include shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing water spreaders at the top and middle of the restoration area, installing logs to promote even water distribution, constructing an outlet and then revegetating. Although the shape of the restored area is not identical to the prior wetland, the area is the same.



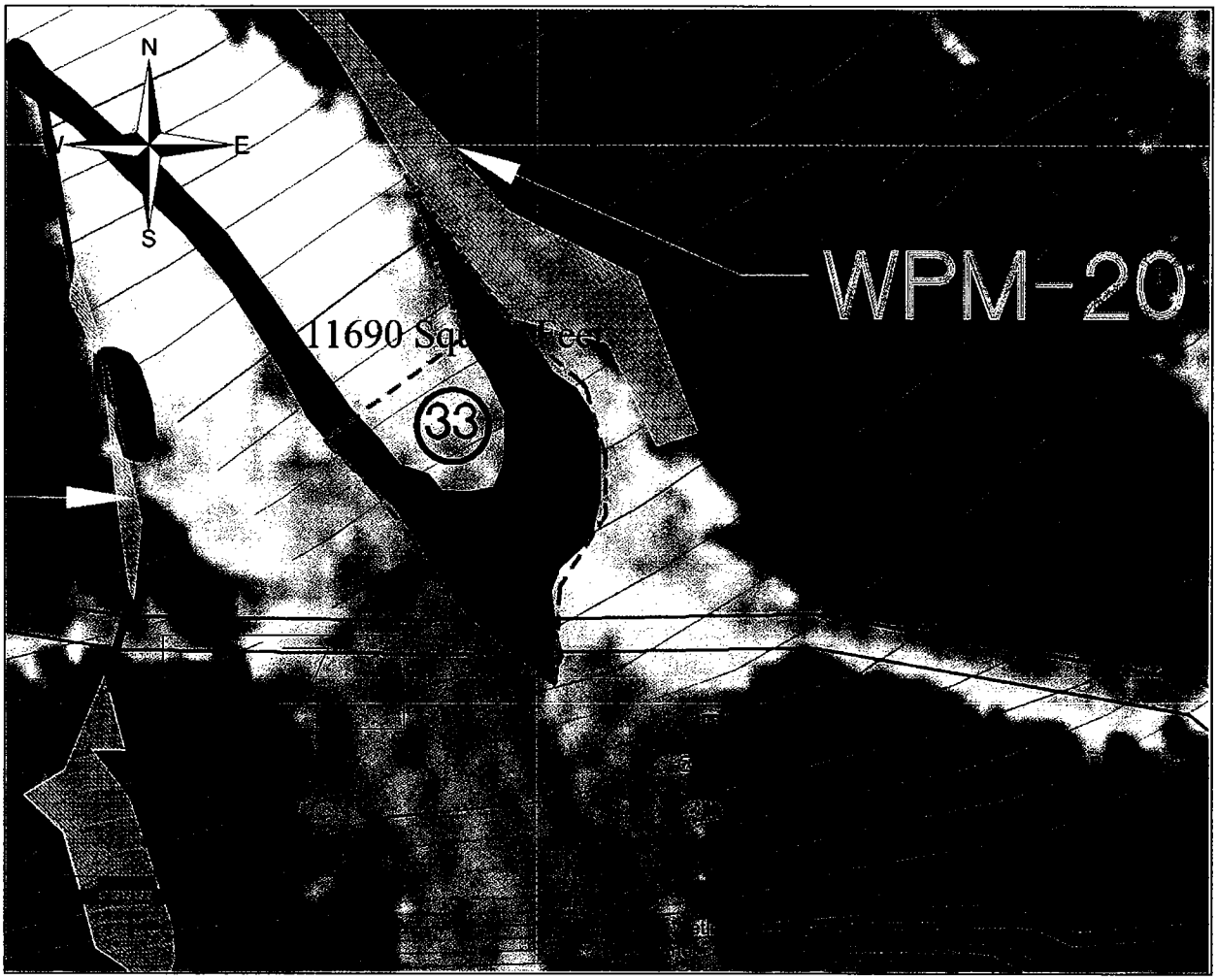
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	32
Culvert No:	None
Wetland No. Above:	WPM-17
Wetland No. Below:	None
Watershed:	Dream Catcher
Ski Run:	Air Apparent
Quadrant:	B-6
Zone:	B
Area of Disturbance:	165 square feet (0.004 acre)
Restoration Plan:	At this site, a small channel leads from Wetland WPM-17 located on the edge of Air Apparent run. The impact consists of fill pushed into one side of the channel. This is a low energy channel. Restoration will include removing fill from the affected side of the channel and then revegetating.



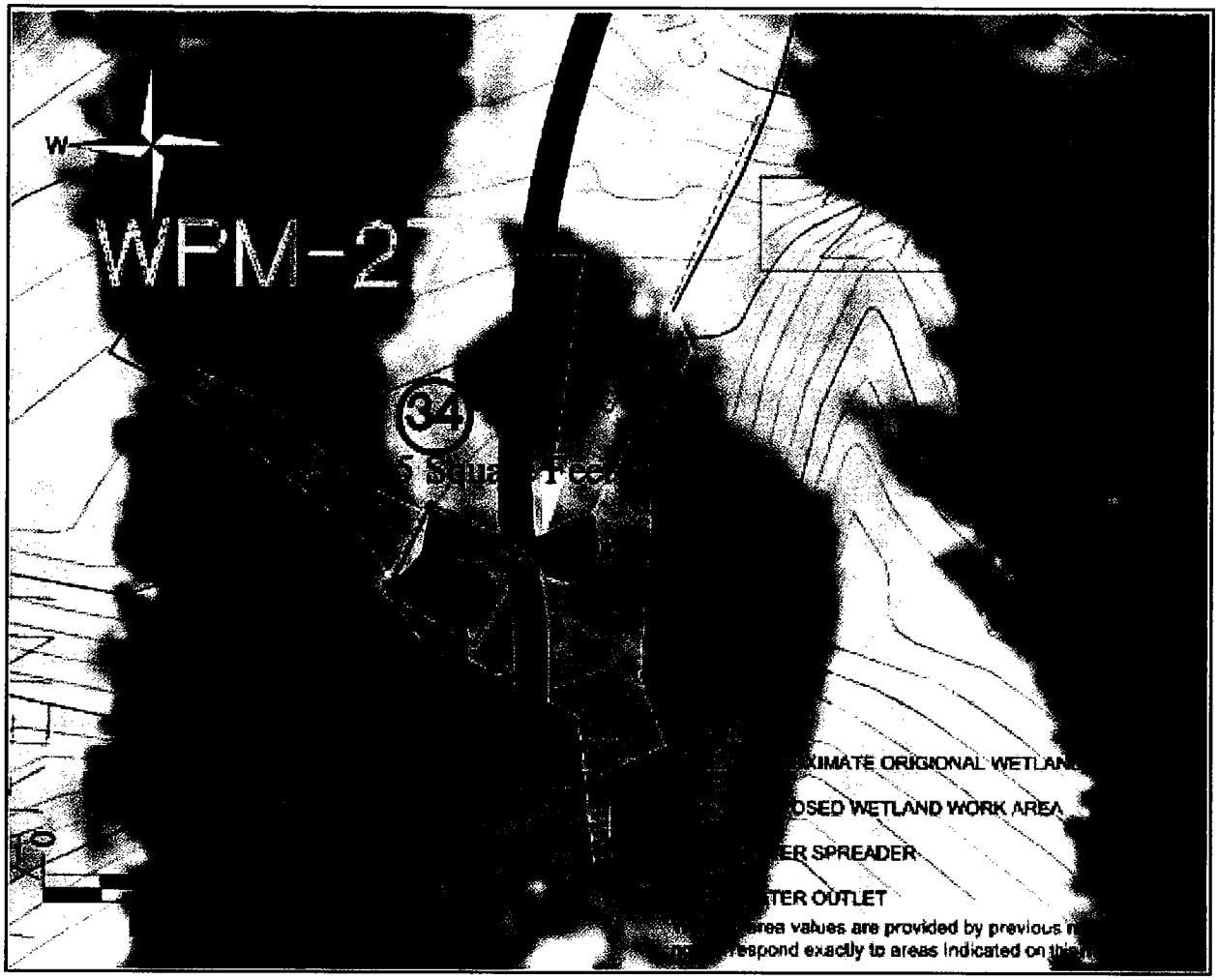
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	33
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	WPM-20
Watershed:	Dream Catcher
Ski Run:	Air Apparent
Quadrant:	B-5 / B-6
Zone:	B
Area of Disturbance:	11690 square feet (0.27 acre)
Restoration Plan:	Restoration will include shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the restoration area, installing logs to promote even water distribution, constructing an outlet and then revegetating.



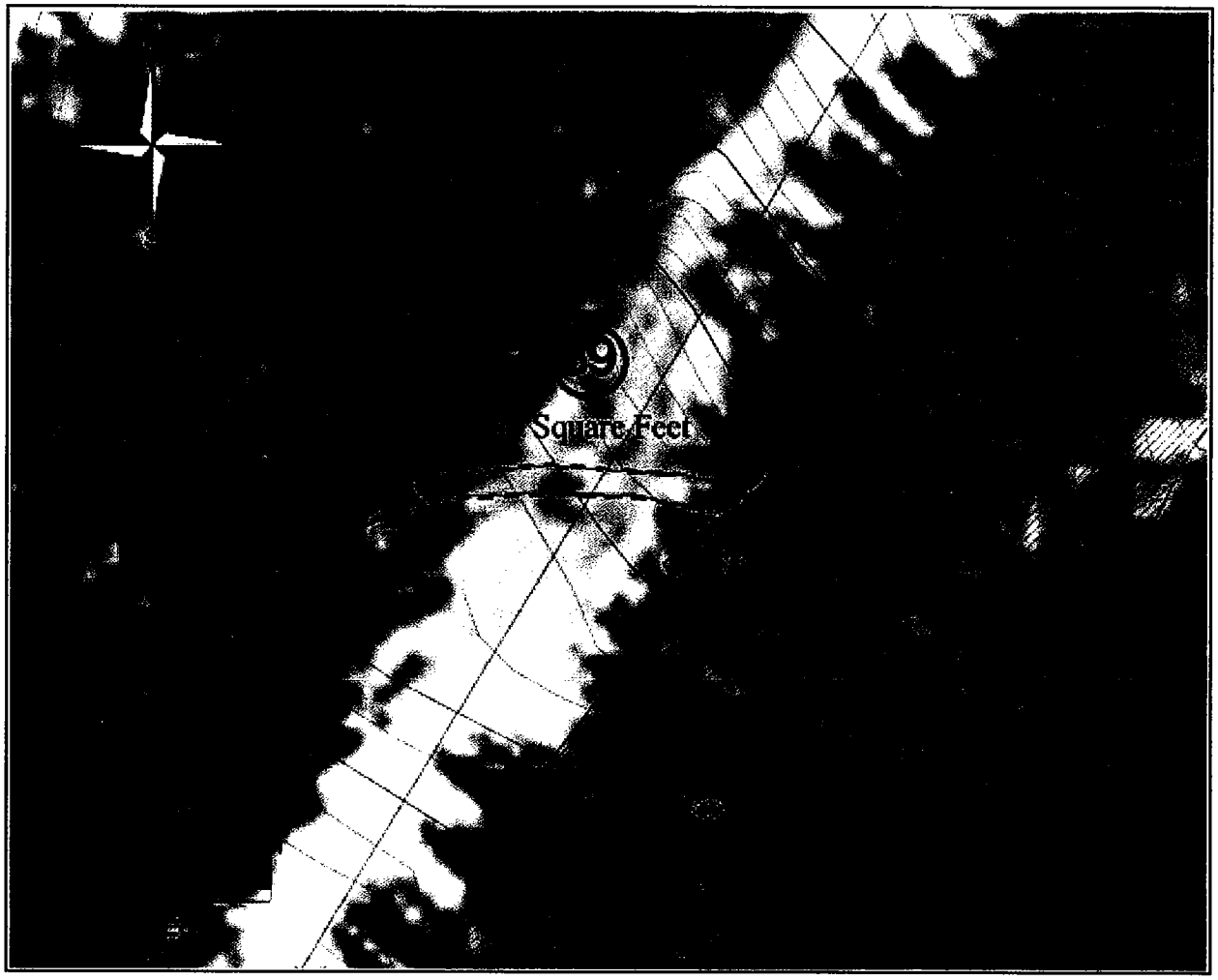
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	34
Culvert No:	None
Wetland No. Above:	WPM-27
Wetland No. Below:	WPM-27
Watershed:	Dream Catcher / American Spirit
Ski Run:	None
Quadrant:	C-6
Zone:	C
Area of Disturbance:	2025 square feet (0.05 acre)
Restoration Plan:	Restoration will include removing fill, smoothing along the contours and then revegetating.



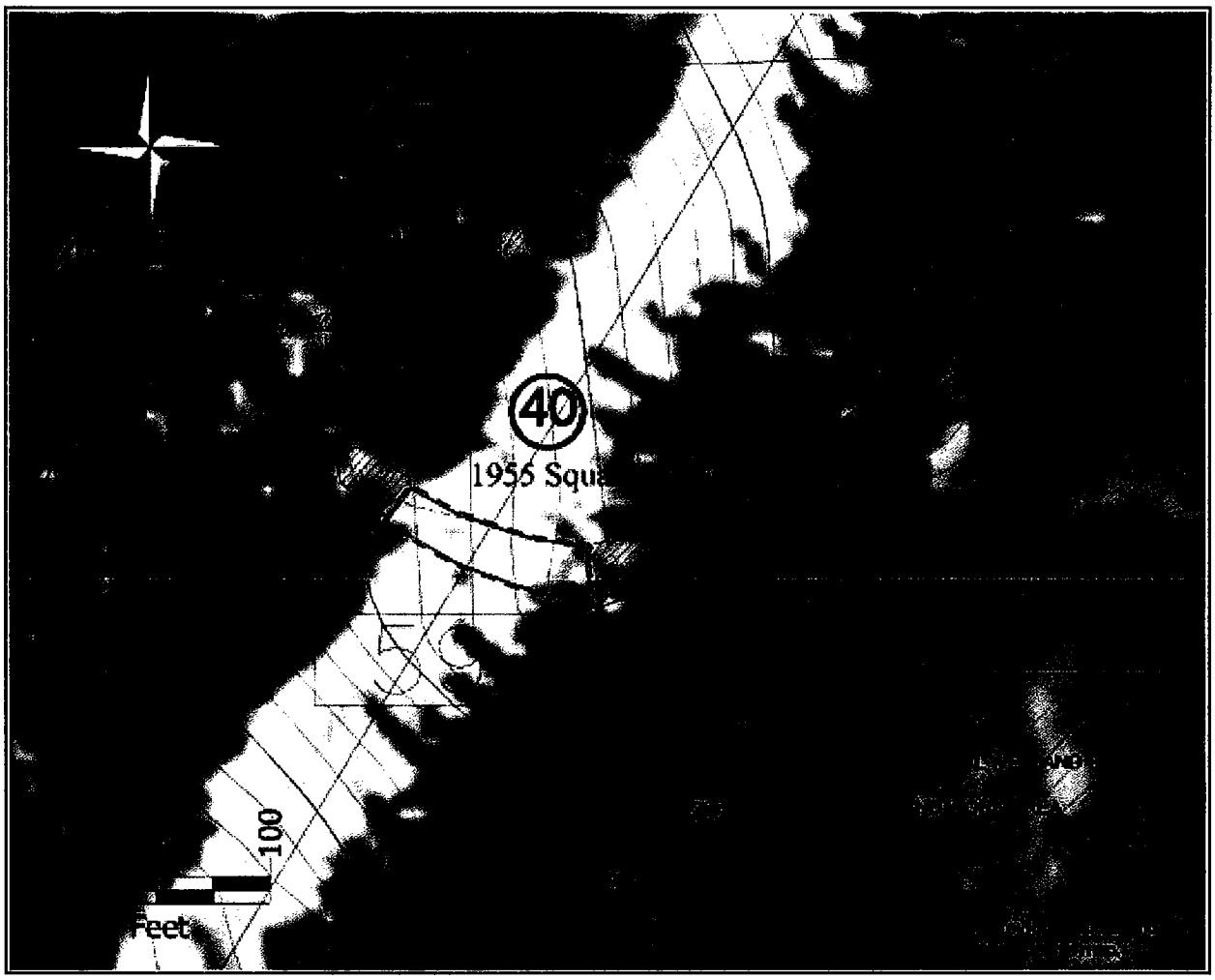
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	39
Culvert No:	None
Wetland No. Above:	146
Wetland No. Below:	2
Watershed:	American Spirit
Ski Run / Lift:	American Spirit Lift
Quadrant:	E/F-2
Zone:	D
Area of Disturbance:	1344 square feet (0.03 acre)
Restoration Plan:	Fill will be removed to form a gently sloping surface from WL-146 eastward to the edge of the lift line fill slope. This surface will be incised into the fill a minimum of 12 inches on the downhill side and restored as wetland. To carry water down the steep fill slope, a high-energy channel will be constructed from the edge of the lift line fill slope east to WL-2.



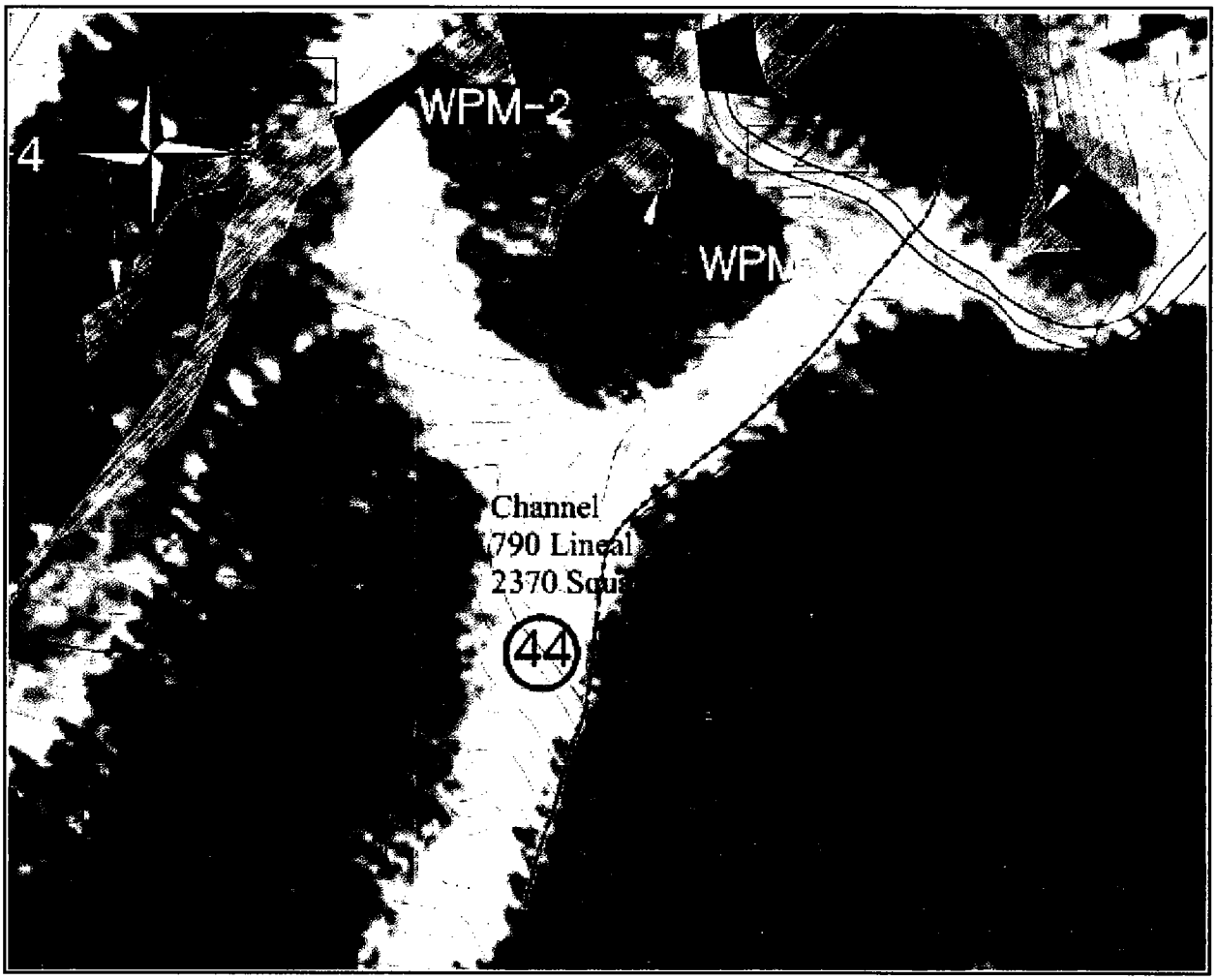
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	40
Culvert No:	59
Wetland No. Above:	140
Wetland No. Below:	2
Watershed:	American Spirit
Ski Run:	American Spirit Lift
Quadrant:	E-2
Zone:	D
Area of Disturbance:	1955 square feet (0.05 acre)
Restoration Plan:	The culvert and associated fill will be removed and the remaining fill shaped to form a gently sloping surface from WL-140 eastward to the edge of the lift line fill slope. This gently sloping surface will be restored as wetland. To carry water down the steep fill slope, a high-energy channel will be constructed from the edge of the lift line fill slope east to WL-2.



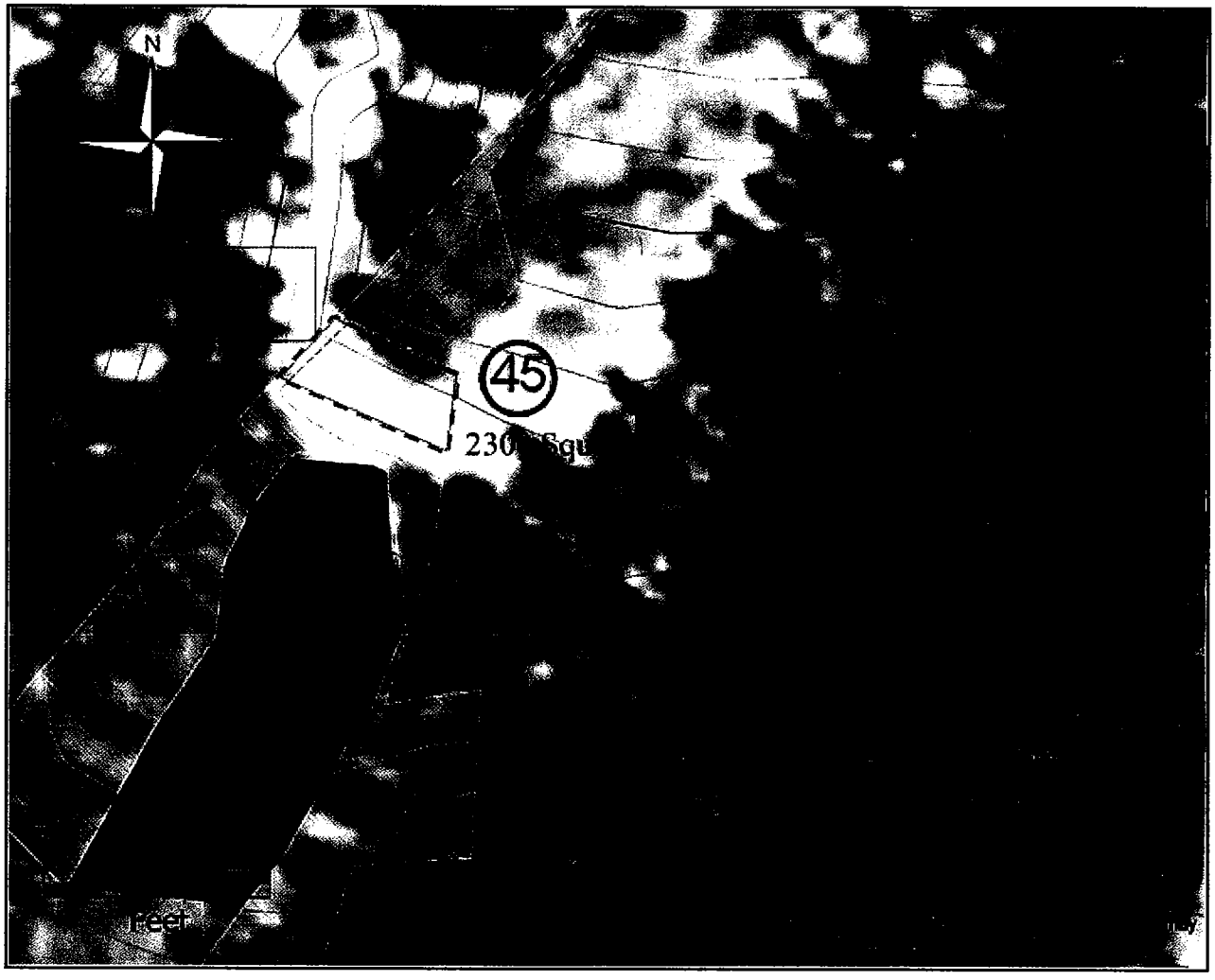
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	44
Culvert No:	None
Wetland No. Above:	BB365
Wetland No. Below:	2
Watershed:	American Spirit
Ski Run:	American Spirit
Quadrant:	E-5
Zone:	C
Area of Disturbance:	2370 square feet (0.05 acre)
Restoration Plan:	Restoration will reconstruct a low energy channel between BB-365 and WL-2 and 2) with a culvert installed under Beginners Luck Road.



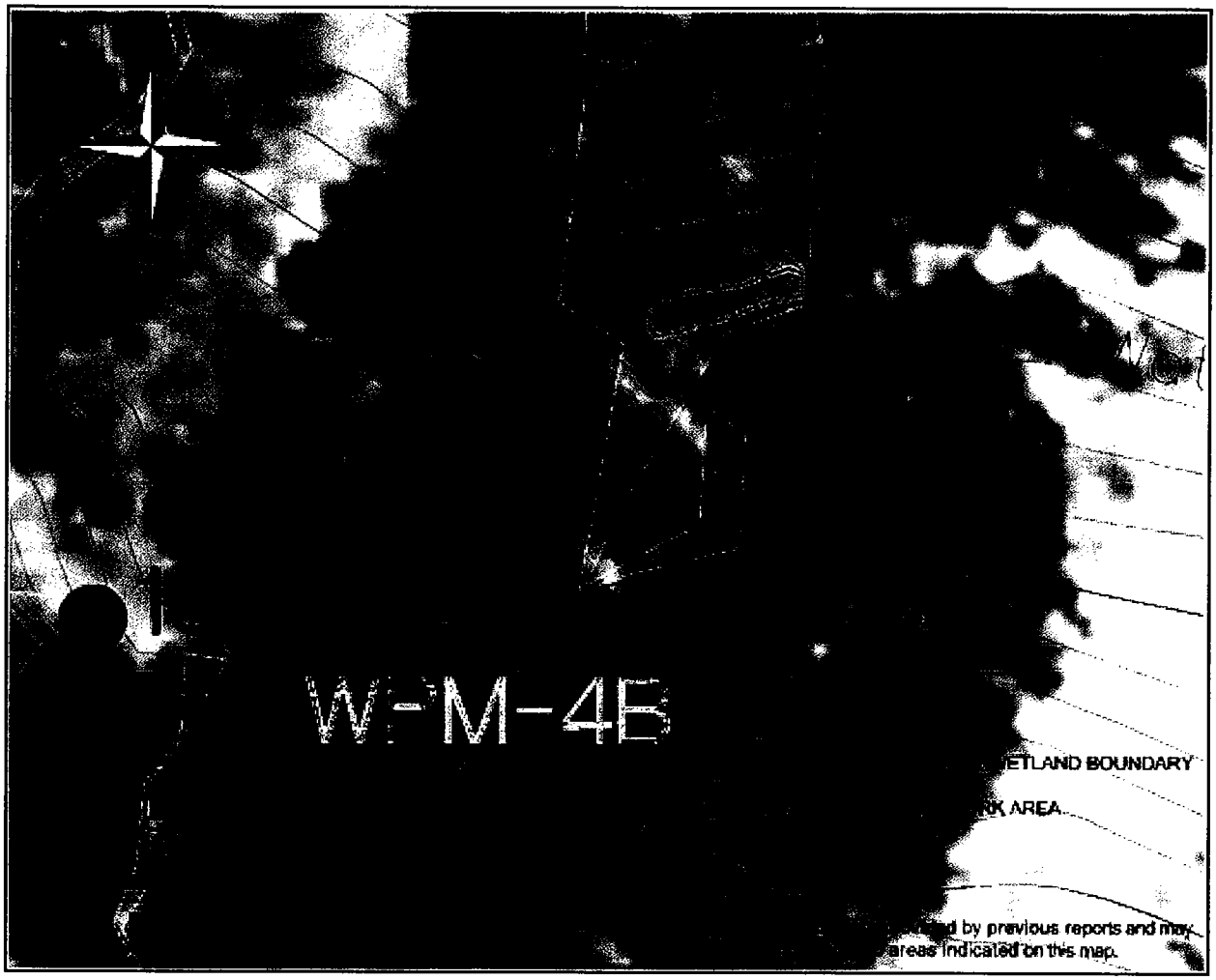
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	45
Culvert No:	28
Wetland No. Above:	WPM-4 / WPM-29
Wetland No. Below:	WPM-4
Watershed:	American Spirit
Ski Run / Road:	None
Quadrant:	D-5
Zone:	C
Area of Disturbance:	2300 square feet (0.05 acre)
Restoration Plan:	Restoration will include removing Culvert 28, shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the restoration area, installing logs to promote even water distribution and then revegetating. A low energy channel design will be incorporated into the wetland restoration area.



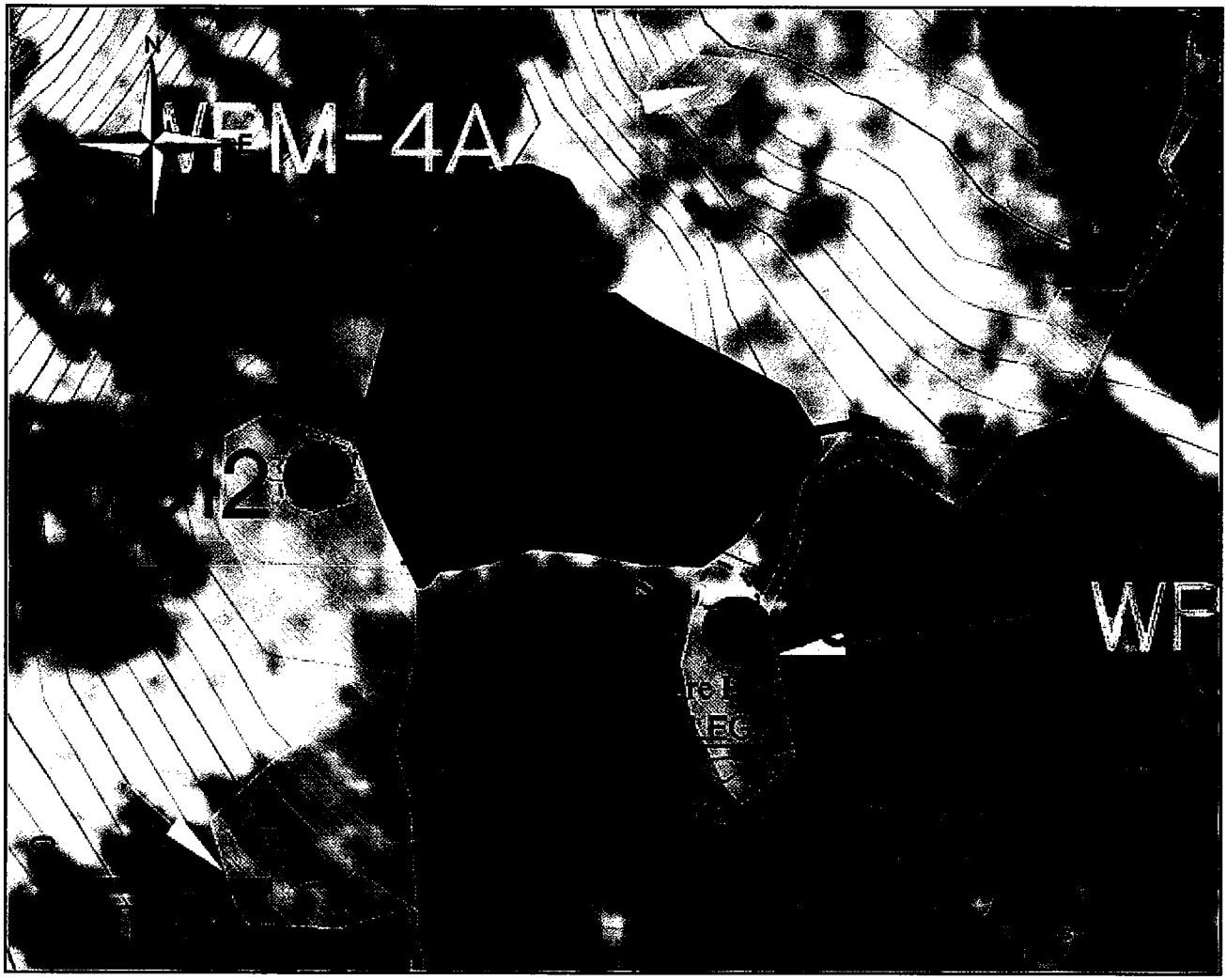
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	46
Culvert No:	None
Wetland No. Above:	WPM-29
Wetland No. Below:	WPM-29
Watershed:	American Spirit
Ski Run:	None
Quadrant:	D 5/6
Zone:	C
Area of Disturbance:	200 square feet (estimated)
Restoration Plan:	At this site a road enters a wetland area from the American Spirit run to the east and there is a culvert installed vertically in the wetland area. The area of disturbance cannot be seen in the air photo and has not been measured. Restoration will include removing the culvert, removing fill, smoothing along the contours and then revegetating.



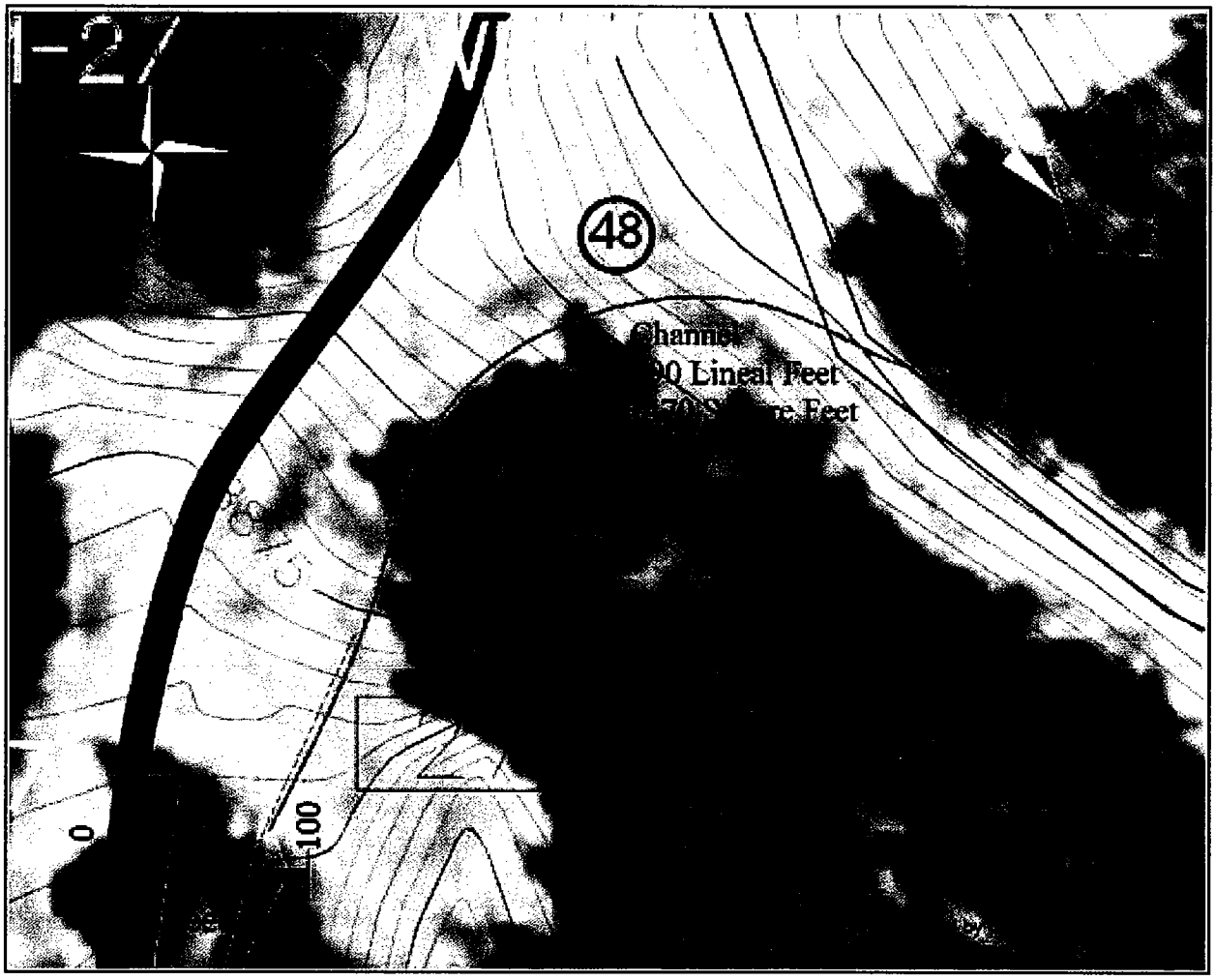
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	47 / 1012 / 1013
Culvert No:	None
Wetland No. Above:	WPM-33
Wetland No. Below:	WPM-4, 4A, & 4B
Watershed:	American Spirit
Ski Run:	None
Zone:	C
Quadrant:	C/D-6
Area of Disturbance:	400 square feet (0.004 acre)
Jurisdiction:	Unknown; see Table 1 in the East Pioneer Areas of Concern report.
Site Description:	This site is a disturbed area on the edge of Wetland WPM-4 with a small amount of fill.
Restoration Plan:	This site includes two small areas noted as EPA Sites 1012 and 1013. Site 1013 was measured by LW as 600 square feet. Site 1012 was identified as being 0.192 acres. Restoration will include removing fill, smoothing along the contours and then revegetating. The site downhill will be reconstructed as Mitigation Site 'A'.



LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	48
Culvert No:	27
Wetland No. Above:	WPM-27
Wetland No. Below:	WPM-33
Watershed:	American Spirit
Ski Run:	Snake
Quadrant:	C-6
Zone:	C
Area of Disturbance:	1470 square feet (0.03 acre)
Restoration Plan:	At this site, Wetland WPM-27 is on the west (uphill) side of Snake run and WPM-33 is on the east (downhill) side. Culvert 27 is immediately below WPM-27. Restoration will include reconstruction of a high energy channel between WPM-27 and WPM-33. Culvert 27 will be removed and a culvert installed under the American Spirit upper lift tower road.

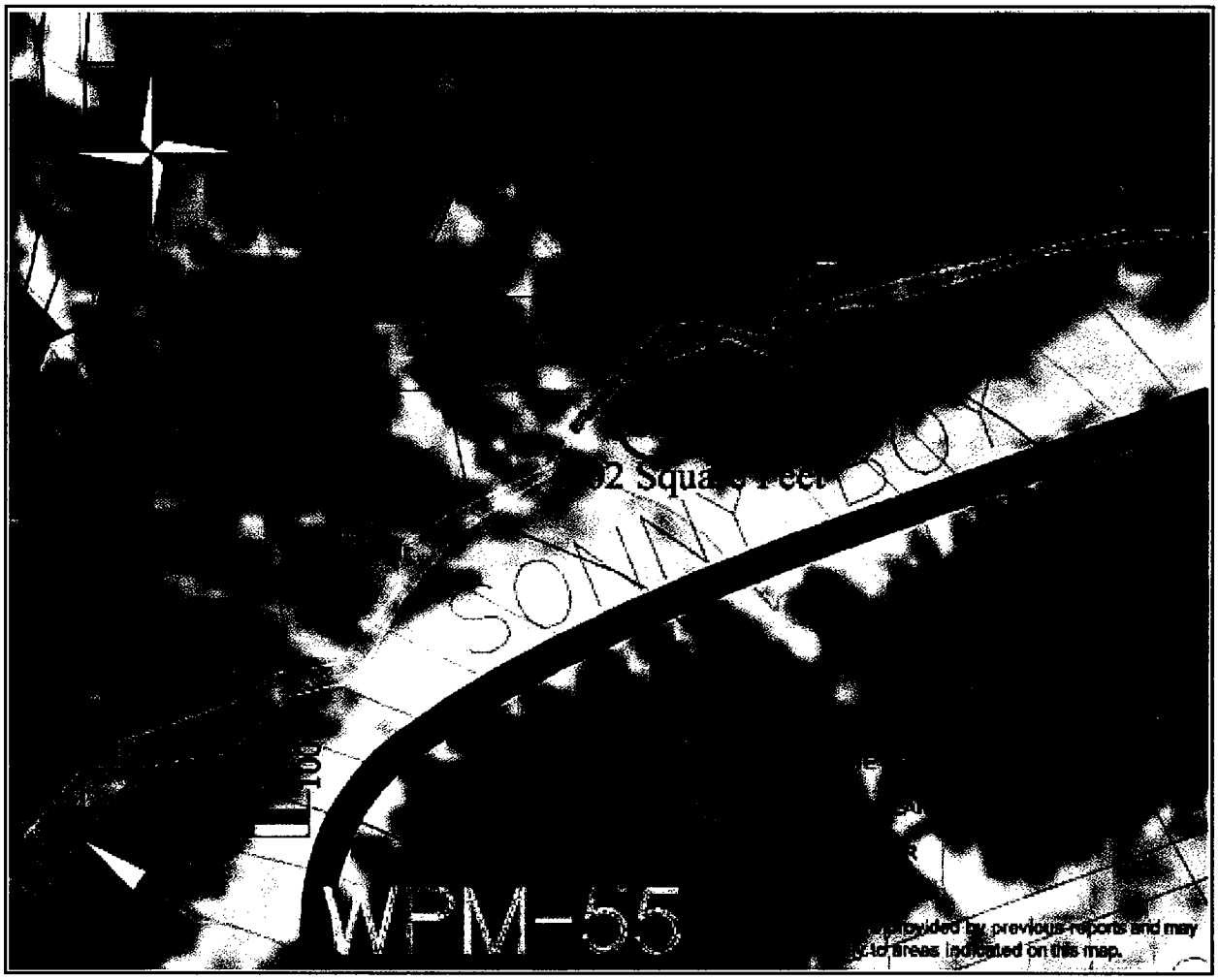


LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	58
Culvert No:	None
Wetland No. Above:	WPM-39
Wetland No. Below:	WPM-55
Watershed:	Edra
Ski Run:	Sonny Boy
Quadrant:	E-7
Zone:	E
Area of Disturbance:	248 square feet (0.005 acre)
Restoration Plan:	This site will be restored as a low energy channel.

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	59
Culvert No:	40
Wetland No. Above:	WPM-55
Wetland No. Below:	WPM-39
Watershed:	Edra
Ski Run:	Logging road
Quadrant:	E-7
Zone:	E
Area of Disturbance:	102 square feet (0.002 acre)
Restoration Plan:	Restoration will include removing Culvert 40 and reconstructing a low energy channel between WPM-55 and WPM-39.



LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	60
Culvert No:	54
Wetland No. Above:	WPM-54
Wetland No. Below:	WPM-54
Watershed:	Edra
Ski Run:	None
Quadrant:	E-7
Zone:	E
Area of Disturbance:	45 square feet (0.001 acre)
Restoration Plan:	At this site, a road between Sonny Boy and Edra runs intersects Wetland WPM-54. Culvert 54 connects the two portions of WPM-54. Restoration will include removing Culvert 54 and reconstructing a low-energy channel between the two portions of WPM-54.

LAND & WATER

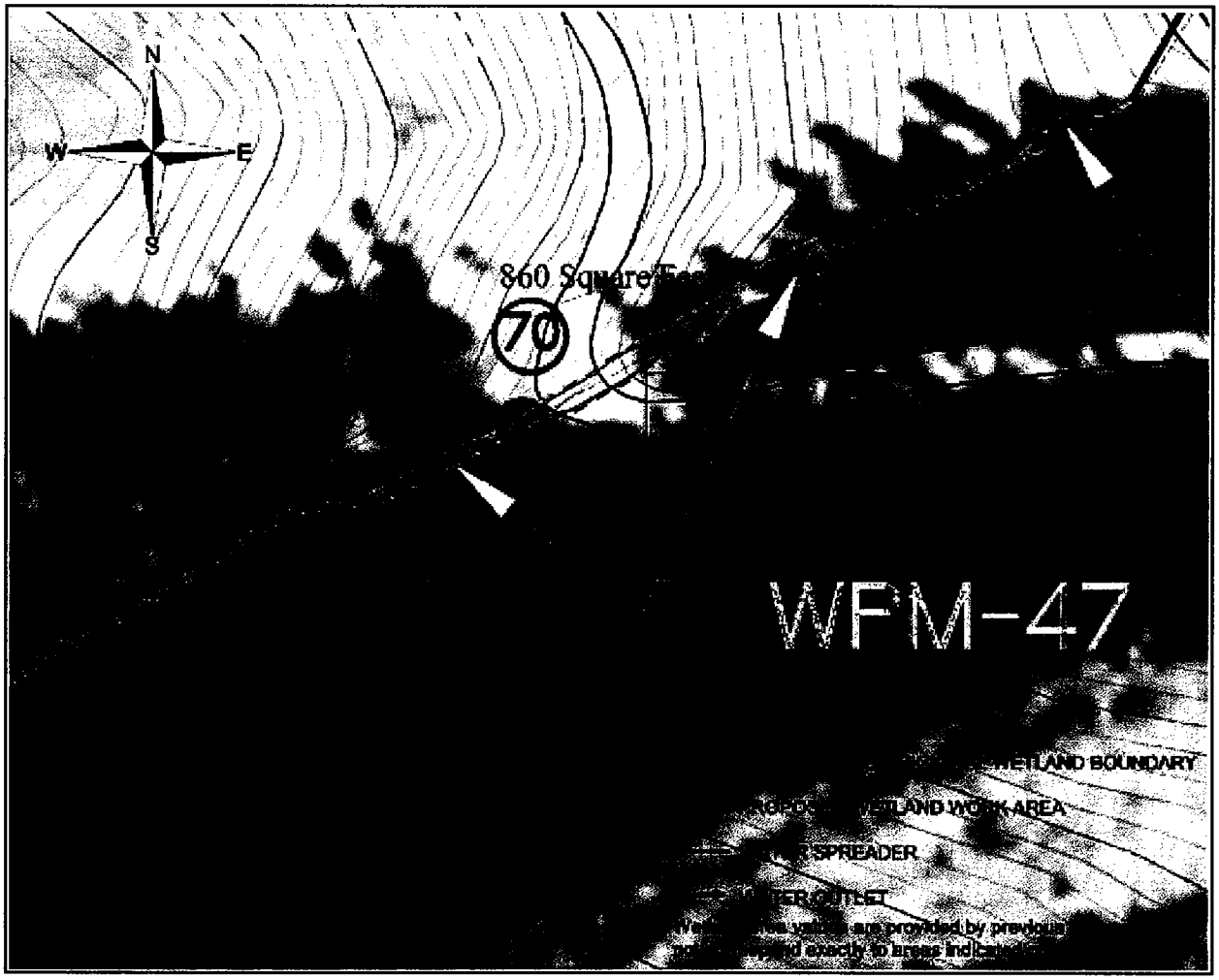
Pioneer Mountain Restoration Site	
LWC Site No:	61
Culvert No:	53
Wetland No. Above:	WPM-53
Wetland No. Below:	WPM-54
Watershed:	Edra
Ski Run / Road:	Tooth Fairy
Quadrant:	D/E-7
Zone:	E
Area of Disturbance:	45 square feet (0.001 acre)
Restoration Plan:	At this site, the Tooth Fairy run /road between Sonny Boy and Edra runs has Wetland WPM-53 on the uphill side and Wetland WPM-54 on the downhill side. Culvert 53 connects these two wetlands. Restoration will include removing Culvert 53 and reconstructing a low energy channel between WPM-53 and WPM-54.

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	68
Culvert No:	37,46
Wetland No. Above:	WPM-46
Wetland No. Below:	WPM-37
Watershed:	Ebitda
Ski Run:	Ebitda / Quarterback Sneak
Quadrant:	G/H-7
Zone:	F
Area of Disturbance:	6171 square feet (0.14 acre)
Restoration Plan:	At the upper end of this site, Ebitda run intersects Wetland WPM-46 and Culvert 46 connects the two portions of WPM-46. At the lower end of this site, Quarterback Sneak run intersects WPM-37 and Culvert 37 connects the two portions of WPM-37. Due to the size and complexity of this site, a detailed channel design will be completed that also addresses stormwater concerns. The existing culvert will be removed. A high energy channel will be constructed along the south side of Quarterback Sneak run connecting the upper and lower portions of WPM-46 as well as a branch connecting WPM-45. These channels will have grade control structures and revegetation.

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	70
Culvert No:	47
Wetland No. Above:	WPM-47
Wetland No. Below:	WPM-47
Watershed:	Ebitda
Ski Run / Road:	Former part of Tooth Fairy
Quadrant:	G-7
Zone:	F
Area of Disturbance:	860 square feet (0.02 acre)
Restoration Plan:	Restoration will include removing Culvert 47 and reconstructing a low energy channel between the two portions of WPM-47.

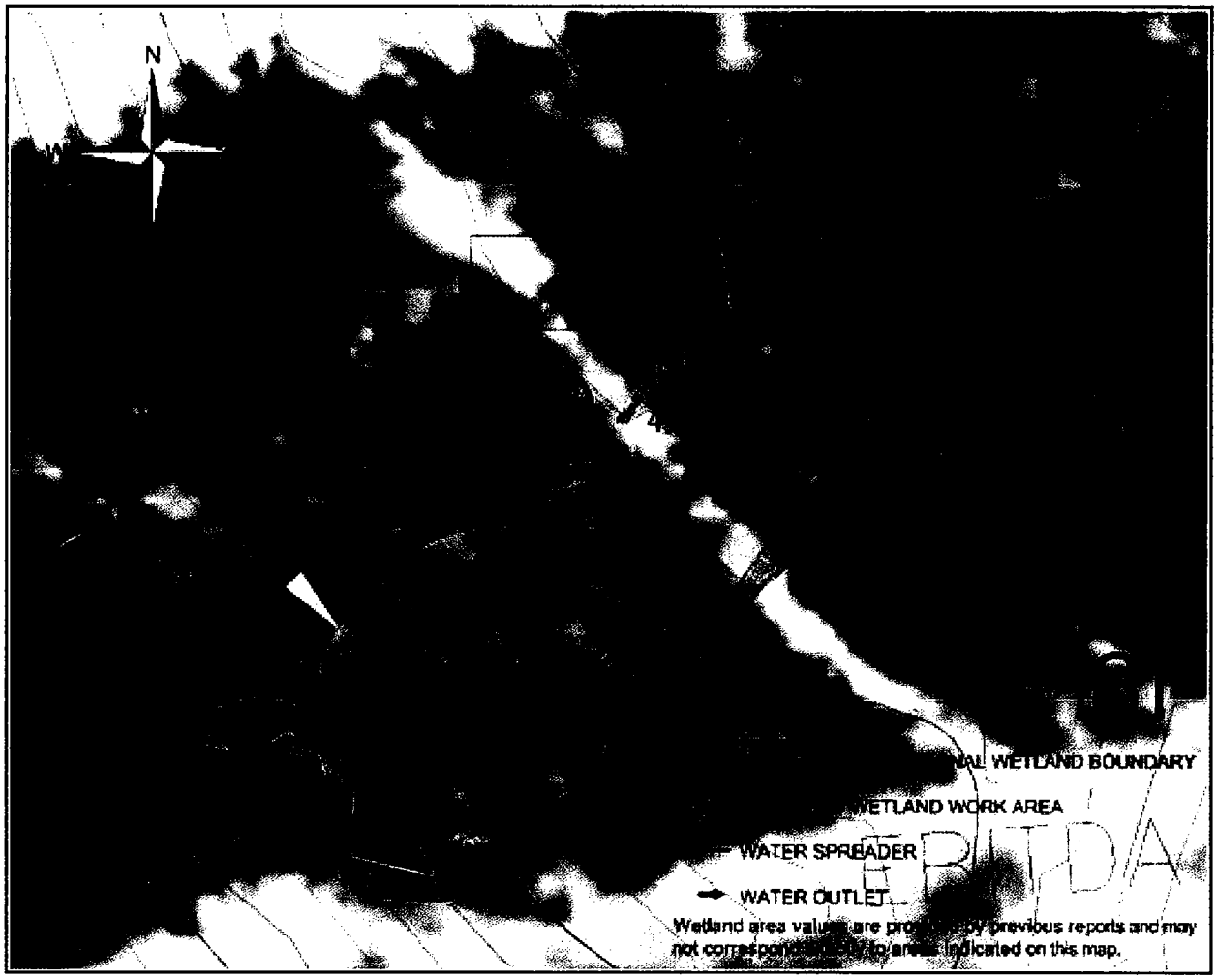


LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	71
Culvert No:	None
Wetland No. Above:	WPM-48
Wetland No. Below:	WPM-45
Watershed:	Ebitda
Ski Run:	None
Quadrant:	F-7
Zone:	F
Area of Disturbance:	114 square feet (0.002 acre)
Restoration Plan:	Restoration will include reconstructing a small low energy channel between WPM-48 and WPM-45.

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	73
Culvert No:	41
Wetland No. Above:	WPM-41
Wetland No. Below:	WPM-41
Watershed:	Ebitda
Ski Run / Road:	Logging road
Quadrant:	E-8
Zone:	E
Area of Disturbance:	49 square feet (0.001acre)
Restoration Plan:	Restoration will include removing Culvert 41 and reconstructing a small low energy channel between the two portions of WPM-54. A water bar will be placed on the road to divert road drainage water from directly entering the wetland.



LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	74
Culvert No:	None
Wetland No. Above:	131
Wetland No. Below:	131
Watershed:	Ebitda
Ski Run / Road:	Logging road
Quadrant:	E-8
Zone:	E
Area of Disturbance:	228 square feet (0.005 acre)
Restoration Plan:	Restoration will include removing fill, smoothing along the contours and then revegetating.

LAND & WATER

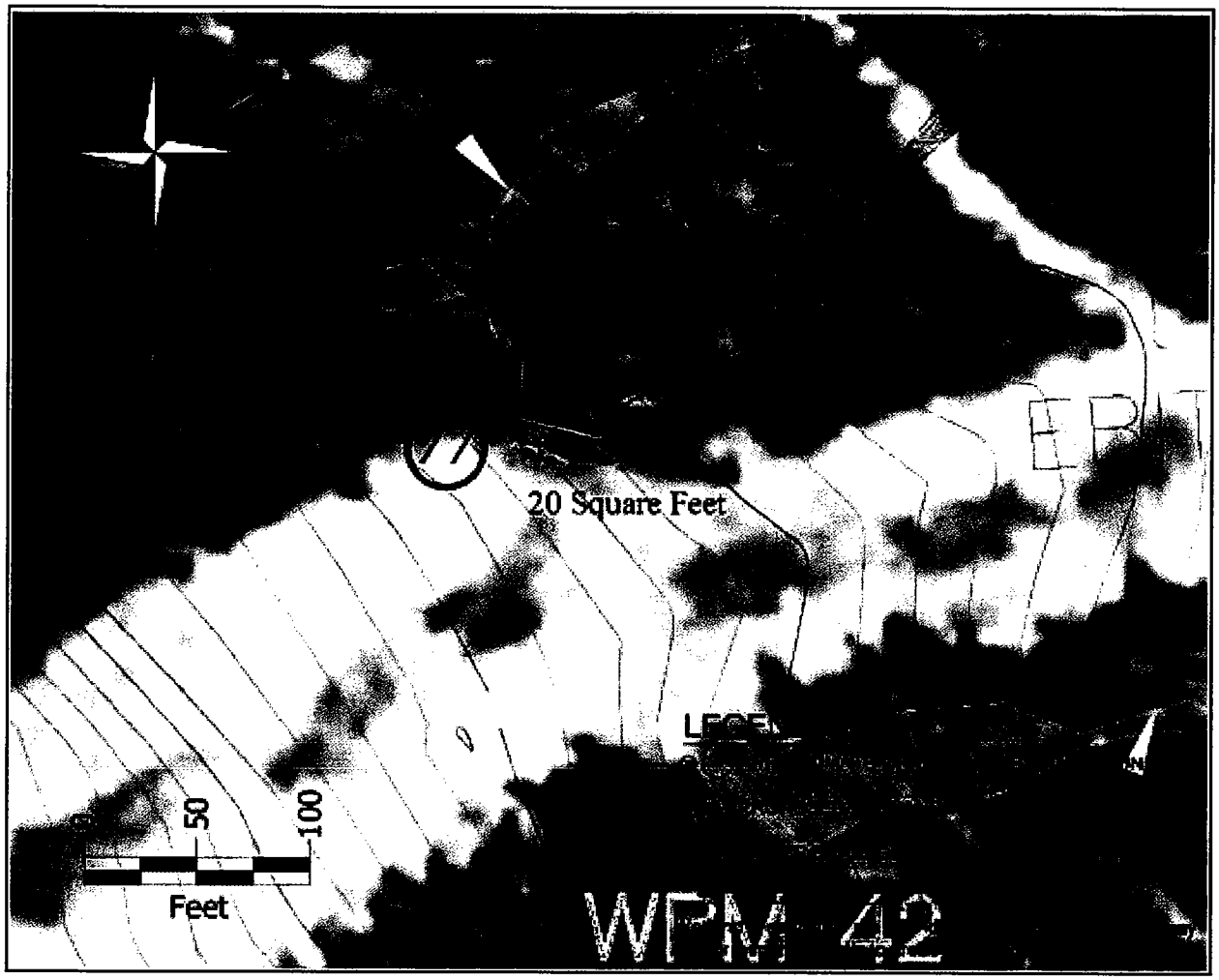
Pioneer Mountain Restoration Site	
LWC Site No:	75
Culvert No:	42
Wetland No. Above:	WPM-42
Wetland No. Below:	WPM-42
Watershed:	Ebitda
Ski Run / Road:	Logging road
Quadrant:	E-8
Zone:	E
Area of Disturbance:	207 square feet (0.005 acre)
Restoration Plan:	Restoration will include removing Culvert 42 and related fill then constructing a low energy channel.

LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	76
Culvert No:	43
Wetland No. Above:	WPM-43
Wetland No. Below:	WPM-43
Watershed:	Ebitda
Ski Run / Road:	Logging road
Quadrant:	E-8
Zone:	E
Area of Disturbance:	60 square feet (0.001 acre)
Restoration Plan:	Restoration will include removing Culvert 43 and related fill then constructing a low energy channel.

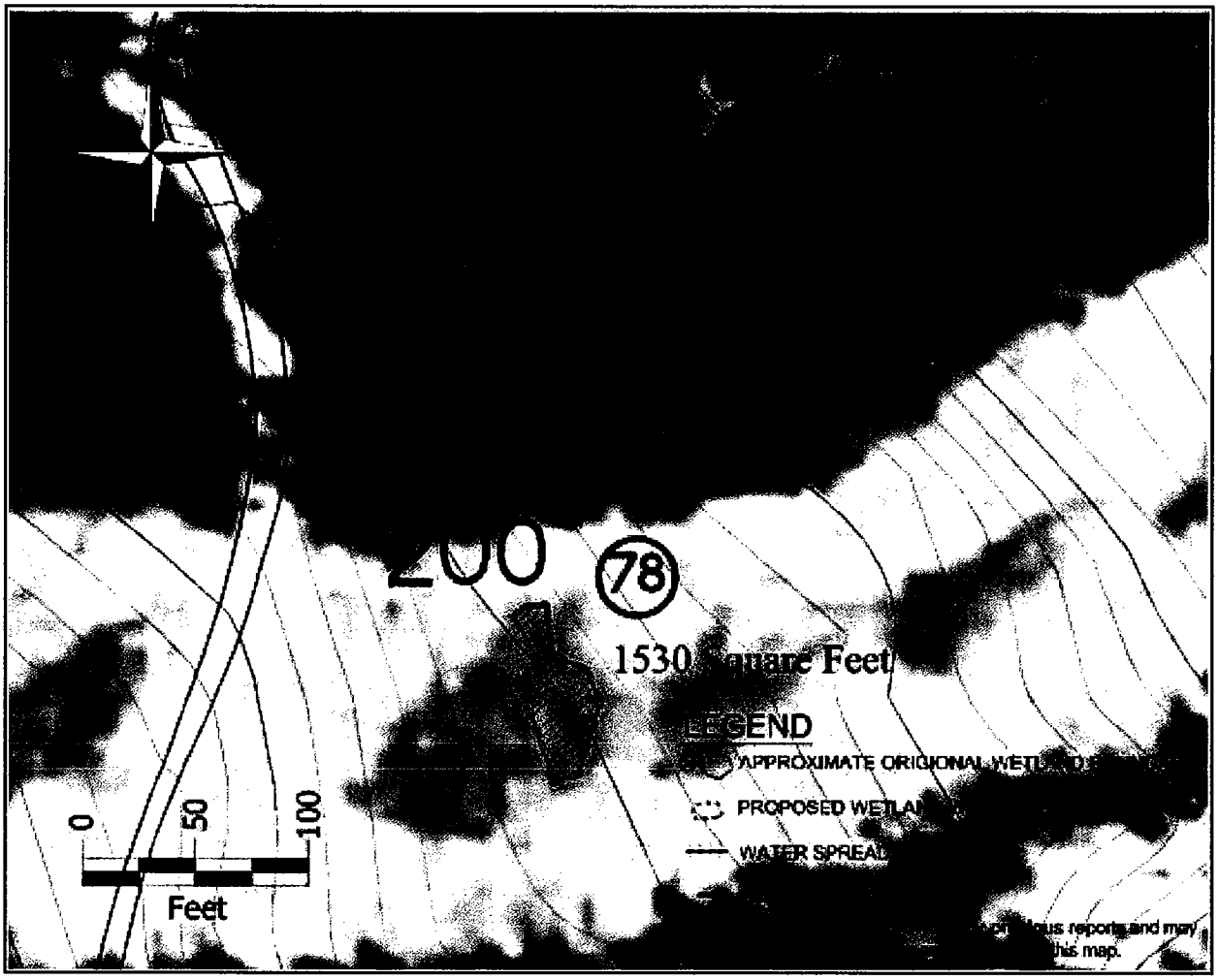
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	77
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	131
Watershed:	Ebitda
Ski Run:	Ebitda
Quadrant:	E-8
Zone:	E
Area of Disturbance:	20 square feet (0.0004 acre)
Restoration Plan:	Restoration will include removing fill, smoothing along the contour and then revegetating.



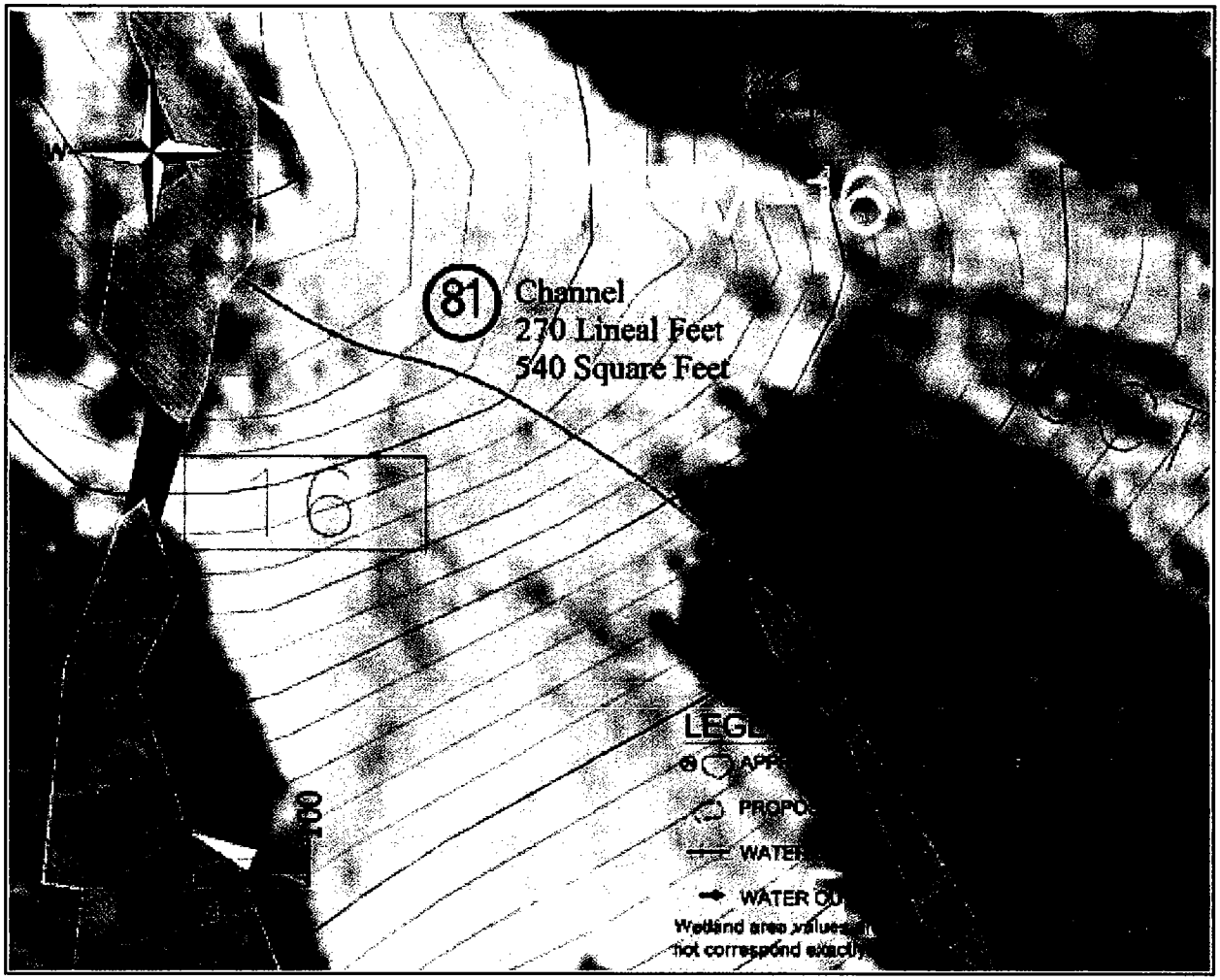
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	78
Culvert No:	None
Wetland No. Above:	None
Wetland No. Below:	None
Watershed:	Ebitda
Ski Run:	Ebitda
Quadrant:	E-8
Zone:	E
Area of Disturbance:	1530 square feet (0.04 acre)
Restoration Plan:	Restoration at this site will provide additional wetland vegetation to accelerate plant development. No topographic adjustment or other treatment is needed.



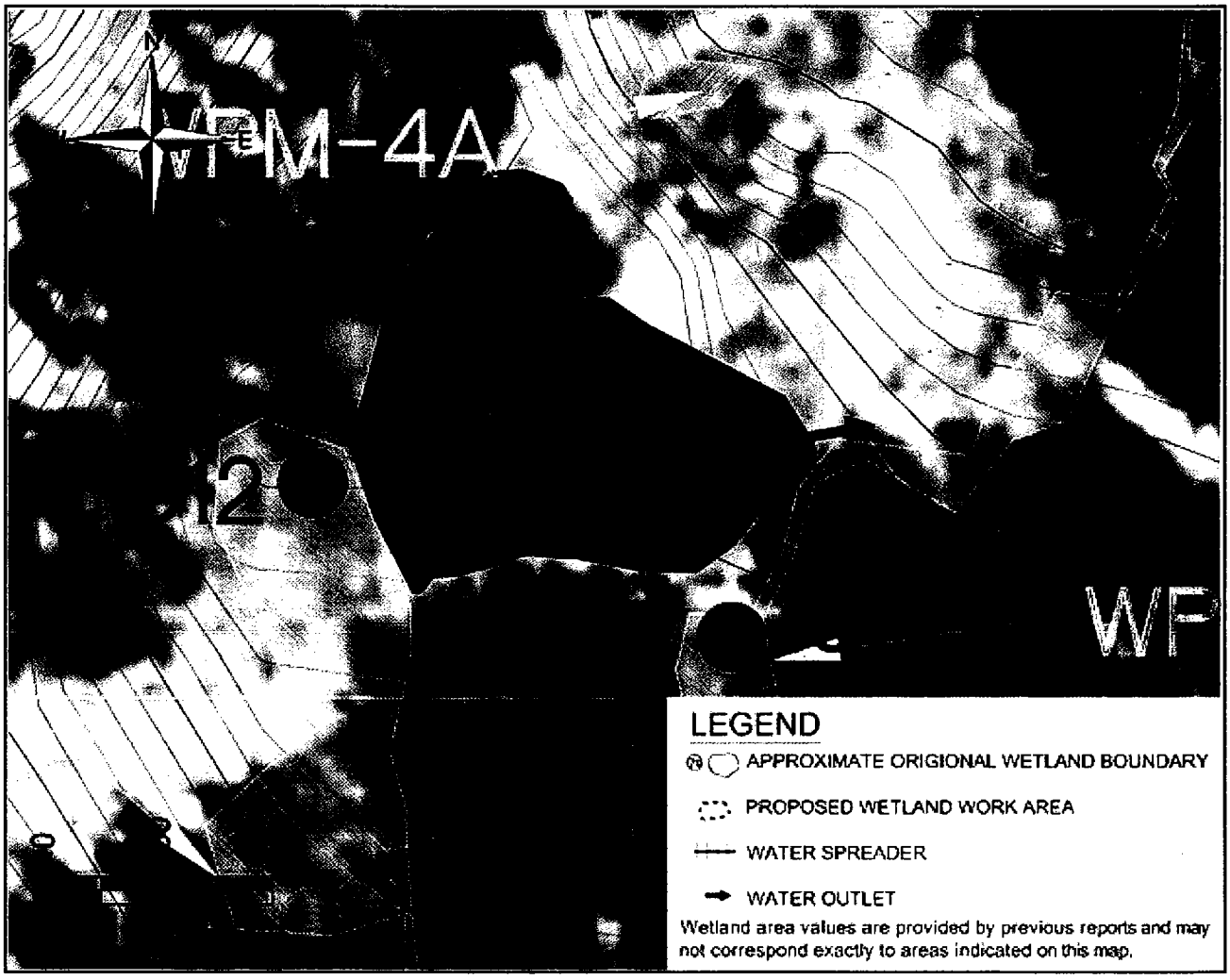
LAND & WATER

Pioneer Mountain Restoration Site	
LWC Site No:	81
Culvert No:	None
Wetland No. Above:	WPM-20
Wetland No. Below:	WPM-16
Watershed:	Dream Catcher
Ski Run:	Dream Catcher
Quadrant:	B-5
Zone:	B
Area of Disturbance:	540 square feet (0.01 acre)
Restoration Plan:	At this site, Wetland WPM-20 is on the uphill (east) side of Dream Catcher run and WPM-22 is on the downhill (west) side of the run. There is no culvert at this location. Restoration will include reconstruction of a high energy channel between WPM-20 and WPM-27.



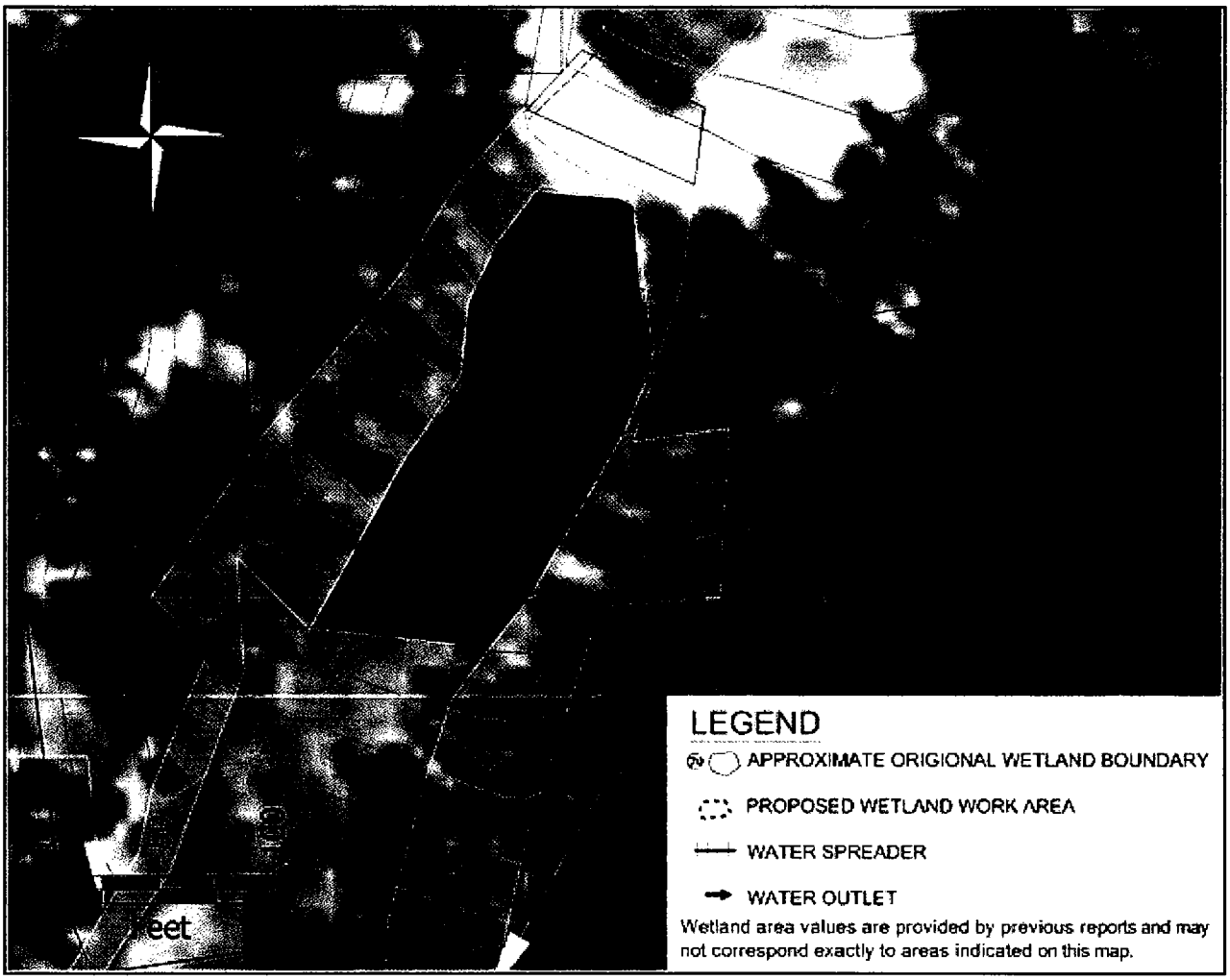
LAND & WATER

Pioneer Mountain Mitigation Site	
Mitigation Site:	A
Wetland No. Above:	WPM-33
Wetland No. Below:	WPM-4, 4A, & 4B
Watershed:	American Spirit
Ski Run:	None
Quadrant:	C/D-6
Zone:	C
Area of Mitigation:	22486 square feet (0.52 acre)
Site Description:	This site is a relatively level area between adjacent wetlands.
Mitigation Plan:	Mitigation will include shallow excavating to define the wetland area (<6 inches), smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the mitigation area, installing logs to promote even water distribution, constructing an outlet and then revegetating. This site will be monitored with monitoring wells, vegetation transects and photopoints at this site and an adjacent reference area.



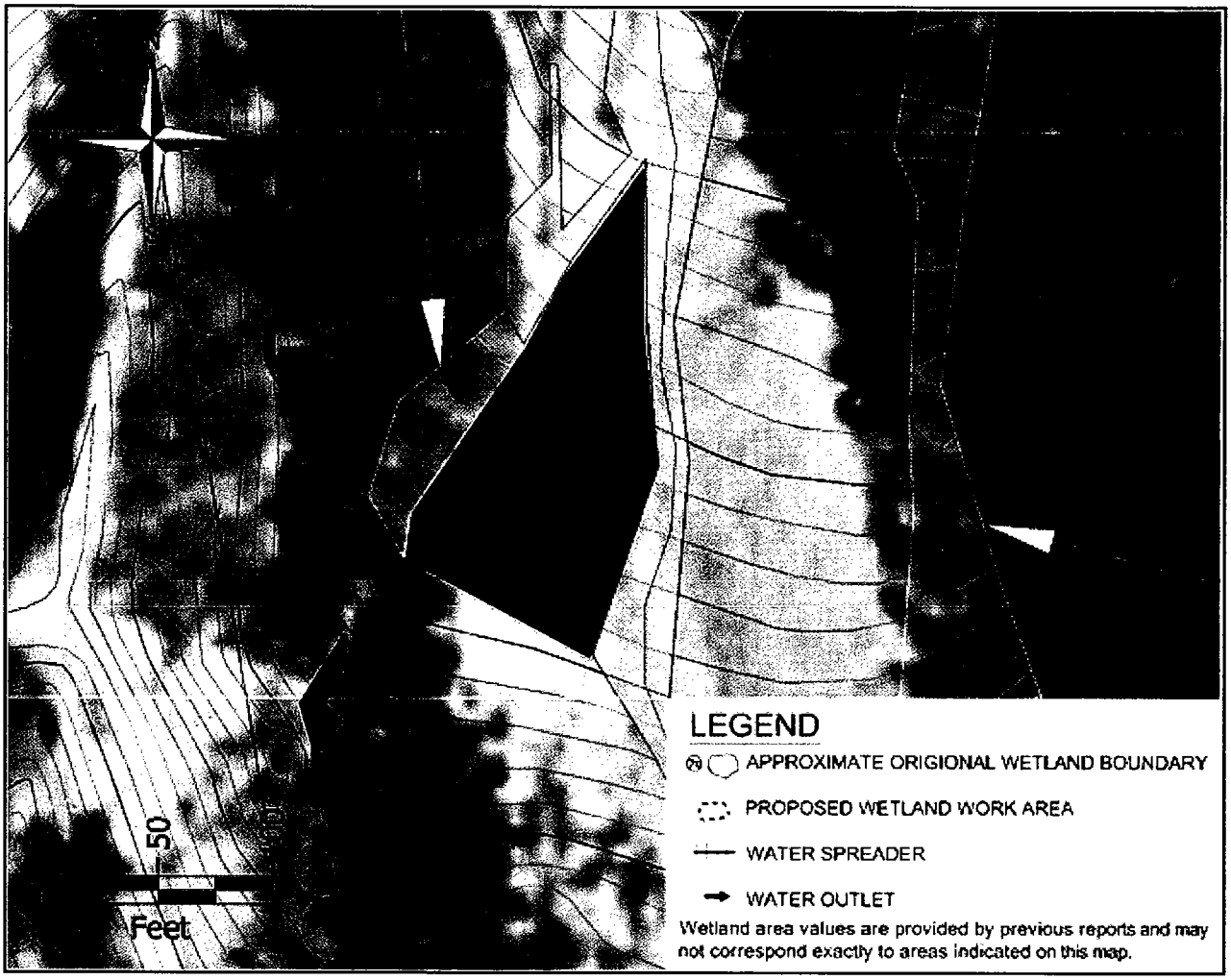
LAND & WATER

Pioneer Mountain Mitigation Site	
Mitigation Site:	B
Culvert No:	28
Wetland No. Above:	WPM-4 / WPM-29
Wetland No. Below:	WPM-4
Watershed:	American Spirit
Ski Run / Road:	None
Quadrant:	D-5
Zone:	C
Area of Mitigation:	15055 square feet (0.34 acre)
Site Description:	This is an upland area between adjacent wetlands. The site slopes gently to the northeast similar to the adjacent wetlands.
Mitigation Plan:	Mitigation will include excavating to lower the topography to match the adjacent wetlands, smoothing the wetland area along the contour to eliminate high and low spots, installing a water spreader at the top of the mitigation area and another approximately half way down the wetland, installing logs to promote even water distribution and then revegetating.



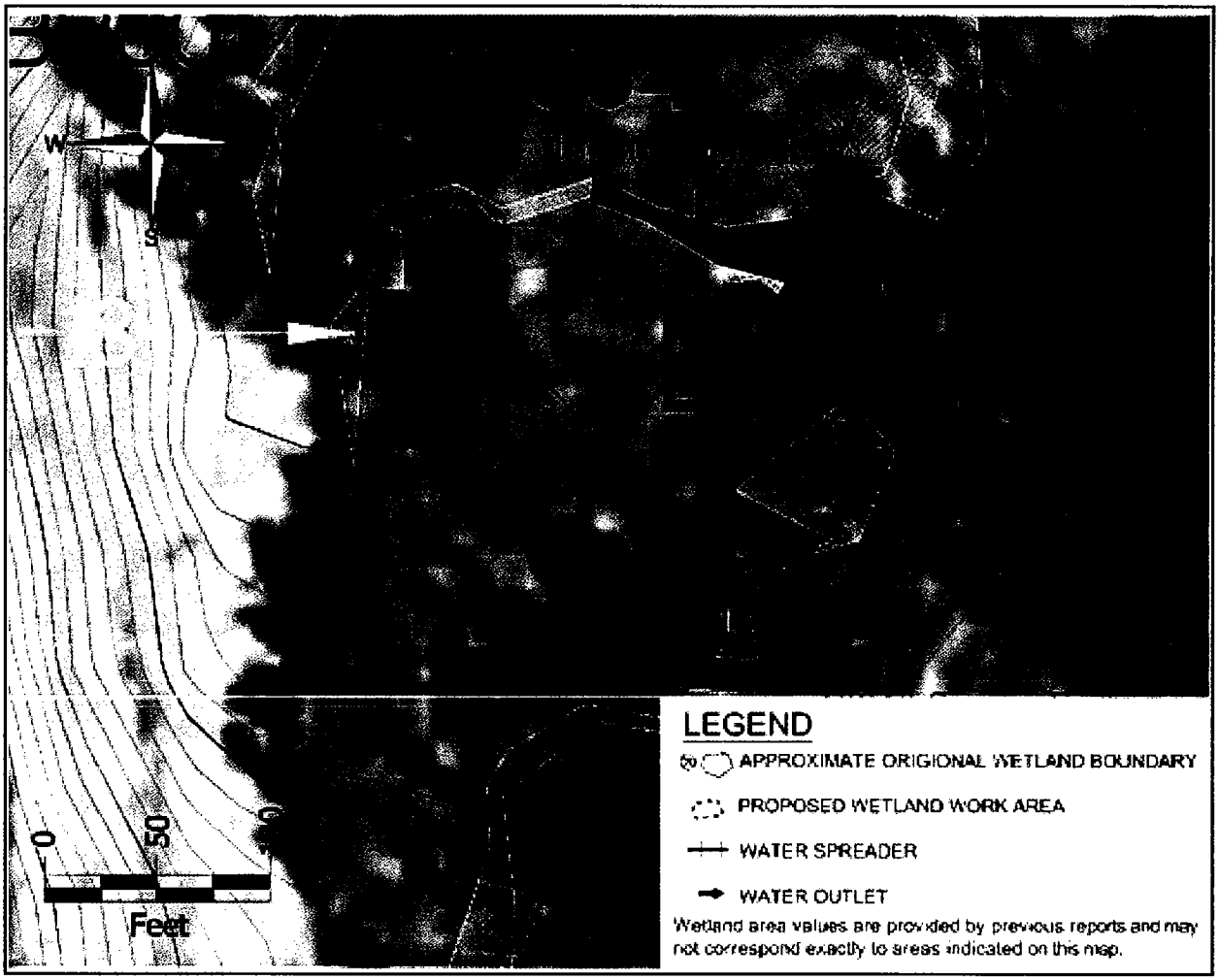
LAND & WATER

Pioneer Mountain Mitigation Site	
Mitigation Site:	C
Wetland No. Above:	WPM-16
Wetland No. Below:	WPM-16
Watershed:	Dream Catcher
Ski Run:	Dream Catcher
Quadrant:	B-5
Zone:	B
Area of Mitigation:	12108 square feet (0.28 acre)
Site Description:	This is a sloping area located between Wetland Restoration Site 22 and WPM-21.
Mitigation Plan:	Due to the size and complexity of this site, a more detailed wetland mitigation design will be completed that is integrated with the final design for Restoration Site 22. Mitigation site construction will likely include shallow excavating to define the wetland area, smoothing the wetland area along the contour, installing water spreaders at the top and middle of the mitigation area as needed, installing logs to promote even water distribution and then revegetating.



LAND & WATER

Pioneer Mountain Mitigation Site	
Mitigation Site:	D
Wetland No. Above:	WPM-16
Wetland No. Below:	WPM-16
Watershed:	Dream Catcher
Ski Run:	East of Dream Catcher
Quadrant:	B-4
Zone:	B
Area of Mitigation:	4,522 square feet (0.10 acre)
Site Description:	This is a nearly level portion of WPM-16 where sediment has been deposited within the wetland area.
Mitigation Plan:	Mitigation will include hand excavation of sediment and deposition in an adjacent upland area. The excavated material will be revegetated with upland grasses. The excavated wetland will be revegetated with wetland plants.



LAND & WATER

APPENDIX C

LAND & WATER

Appendix C

ROUTINE WETLAND DETERMINATION FORMS FOR POTENTIAL WETLAND REFERENCE AREAS

Yellowstone Club East Pioneer Mountain
Wetland Restoration and Mitigation Plan

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Berglund
Date: 23-Aug-2002
County: Madison
State: Montana
Plot ID: 02

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: Emergent
Transect ID: PM 002
Field Location: Cabins to Am Spirit Lift Base (E side)

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Calamagrostis canadensis	Herb	FACW+	*Bromus ciliatus*	Herb	FAC+
Reedgrass,Blue-Joint			Brome,Fringed		
Senecio triangularis	Herb	FACW+	*Abies lasiocarpa*	Herb	FACU
Groundsel,Arrow-Leaf			Fir,Subalpine		
Trollius laxus	Herb	OBL	*Thalictrum occidentale*	Herb	FAC
Globeflower,American			Meadow-Rue,Western		
Carex rostrata	Herb	OBL	*Picea engelmannii*		
Sedge,Beaked			Spruce,Engelmann's		
Equisetum arvense	Herb	FAC			
Horsetail,Field					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 7/9 = 77.78%
FAC Neutral: 4/6 = 66.67%
Numeric Index: 23/9 = 2.56

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
N/A Stream, Lake or Tide Gauge
N/A Aerial Photographs
N/A Other
YES No Recorded Data

Field Observations
Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: = 0.0 (in.)

Wetland Hydrology Indicators
Primary Indicators
NO Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
NO Drainage Patterns in Wetlands
Secondary Indicators
NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Berglund
Date: 23-Aug-2002
County: Madison
State: Montana
Plot ID: 02

SOILS

Map Unit Name (Series and Phase): Shadow very flaggy loam, 45-70%
Map Symbol: 122 Drainage Class: somewhat excessively drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic-Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	A/B	2.5Y4/2	7.5YR5/8	Many Prominent	Clay loam

Hydric Soil Indicators:
NO Histosol
NO Histic Epipedon
NO Sulfidic Odor
NO Aquic Moisture Regime
NO Reducing Conditions
YES Gleyed or Low Chroma Colors
NO Concretions
NO High Organic Content in Surface Layer in Sandy Soils
NO Organic Streaking in Sandy Soils
NO Listed on Local Hydric Soils List
NO Listed on National Hydric Soils List
NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is the Sampling Point within the Wetland? (Yes) No

Remarks:
Connection: Uphill connection is WPM #1 (at cabins). Very long series of D&D and wetlands. Disturbance: unknown.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Howard
Date: 18-Jul-2002
County: Madison
State: Montana
Plot ID: 109

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: EM
Transect ID: PM 109
Field Location:
E of 108; Betw. Dreamcatcher& Lake Lilt

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator
Mertensia ciliata	Herb	FACW+
Bluebells,Streamside		
Senecio triangularis	Herb	FACW+
Groundsel,Arrow-Leaf		
Castilloja rhexifolia	Herb	FAC
Indian-Paintbrush,Rhexia-Leaf		
Arnica longifolia	Herb	FACW
Arnica,Seep Spring		

Plant Species(Latin/Common)	Stratum	Indicator
Erigeron peregrinus	Herb	FACW
Fleabane,Wandering		
Trollius laxus	Herb	OBL
Globeflower,American		
Ranunculus oschscholtzii	Herb	FACW
Duller-Cup,Eschscholtz		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 7/7 = 100.00%
FAC Neutral: 6/6 = 100.00%
Numeric Index: 14/7 = 2.00

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
N/A Stream, Lake or Tide Gauge
N/A Aerial Photographs
N/A Other
YES No Recorded Data

Field Observations
Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: = 0 (in.)

Wetland Hydrology Indicators
Primary Indicators
NO Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
NO Drainage Patterns in Wetlands
Secondary Indicators
NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:
Some water discharges into the soil.

WetForm

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Howard
Date: 18-Jul-2002
County: Madison
State: Montana
Plot ID: 109

SOILS

Map Unit Name (Series and Phase): Gariel very channery sandy loam
Map Symbol: 46 Drainage Class: well drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
2	A/B	10YR3/3	N/A	N/A N/A	Clay loam
10	A/B	2.5Y4/2	10YR4/6	Few Faint	Clay loam

Hydric Soil Indicators:
NO Histosol
NO Histic Epipedon
NO Sulfidic Odor
NO Aquic Moisture Regime
NO Reducing Conditions
YES Gleyed or Low Chroma Colors
NO Concretions
NO High Organic Content in Surface Layer in Sandy Soils
NO Organic Streaking in Sandy Soils
NO Listed on Local Hydric Soils List
NO Listed on National Hydric Soils List
NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No
Is the Sampling Point within the Wetland? (Yes) No

Remarks:
Connection: Isolated. Disturbance: ???

WetForm

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 19-Jul-2002	
Applicant/Owner: Yellowstone Mountain Club		County: Madison	
Investigators: Berglund, Howard		State: Montana	
		Plot ID: 112	

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID: PM 112
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		Betw LakeLili/Dreamc.; Add to WW15

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Senecio triangularis	Herb	FACW+	*Castilloja rhexifolia*	Herb	FAC
Groundsel,Arrow-Leaf			Indian-Paintbrush,Rhexia-Leaf		
Mertensia ciliata	Herb	FACW+	*Trollius laxus*	Herb	OBL
Bluebells,Streamside			Globeflower,American		
Amica latifolia	Herb	FAC-			
Arnica,Mountain					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 4/5 = 80.00%

FAC Neutral: 3/3 = 100.00%

Numeric Index: 11/5 = 2.20

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A (In.)
Depth to Free Water in Pit:	N/A (In.)
Depth to Saturated Soil:	= 0.0 (In.)

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 19-Jul-2002
Applicant/Owner: Yellowstone Mountain Club		County: Madison
Investigators: Berglund, Howard		State: Montana
		Plot ID: 112

SOILS

Map Unit Name (Series and Phase): Gariel very channery sandy loam

Map Symbol: 46 Drainage Class: well drained

Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts

Mapped Hydric Inclusion? Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	A/B	10YR4/2	10YR5/6	Few Distinct	Clay loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

Connection: Connects to upper end of WW #15. Disturbance: Was apparent fill placed between this peice of 15, the piece on the ski slope, and the downhill seep. All likely jurisdictional.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Howard, Berglund
Date: 19-Jul-2002
County: Madison
State: Montana
Plot ID: 115

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: Emergent
Transect ID: PM 115
Field Location: Uphill of Harry Water Rd; E&N of 113&114

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Senecio triangularis	Herb	FACW+	*Castilleja rhexifolia*	Herb	FAC
Groundsel,Arrow-Leaf			Indian-Paintbrush,Rhexia-Leaf		
Mertensia ciliata	Herb	FACW+			
Bluebells,Streamside					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%
FAC Neutral: 2/2 = 100.00%
Numeric Index: 7/3 = 2.33

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
N/A Stream, Lake or Tide Gauge
N/A Aerial Photographs
N/A Other
YES No Recorded Data

Field Observations
Depth of Surface Water: N/A (In.)
Depth to Free Water in Pit: N/A (In.)
Depth to Saturated Soil: = 0.0 (In.)

Wetland Hydrology Indicators
Primary Indicators
NO Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
YES Drainage Patterns in Wetlands
Secondary Indicators
NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Howard, Berglund
Date: 19-Jul-2002
County: Madison
State: Montana
Plot ID: 115

SOILS

Map Unit Name (Series and Phase): Garlet very channery sandy loam
Map Symbol: 46 Drainage Class: well drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	A/B	2.5Y4/2	2.5Y5/6	Common	Distinct	Clay loam
10	A/B	2.5Y5/1	N/A	N/A	N/A	Clay loam

Hydric Soil Indicators:
NO Histosol
NO Histic Epipedon
NO Sulfidic Odor
NO Aquic Moisture Regime
NO Reducing Conditions
YES Gleyed or Low Chroma Colors
NO Concretions
NO High Organic Content in Surface Layer in Sandy Soils
NO Organic Streaking in Sandy Soils
NO Listed on Local Hydric Soils List
NO Listed on National Hydric Soils List
NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No
Is the Sampling Point within the Wetland? (Yes) No

Remarks:
Connection: 115 is an extension of the south (upslope) boundary and east boundary of WW #15. Disturbance: Harry's water road and Dreamcatcher intercepts and has disturbed east extension of wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	**Project No:** 140347	**Date:** 20-Aug-2002	
Applicant/Owner: Yellowstone Mountain Club		**County:** Madison	
Investigators: G. Howard		**State:** Montana	
		Plot ID: 120	

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		W. of American Spirit Lift

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Carex rostrata	Herb	OBL	*Carex aquatilis*	Herb	OBL
Sedge,Beaked			Sedge,Water		
Senecio triangularis	Herb	FACW+	*Parnassia fimbriata*	Herb	OBL
Groundsel,Arrow-Leaf			Grass-Of-Parnassus,Fringed		
Trollius laxus	Herb	OBL	*Calamagrostis canadensis*	Herb	FACW+
Globeflower,American			Reedgrass,Blue-Joint		
Saxifraga arguta	Herb	FACW+	*Ledum glandulosum*	Shrub	FACW+
Saxifrage,Brook			Labrador-Tea,Glandular		
Juncus mertensianus	Herb	OBL			
Rush,Merten's					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 9/9 = 100.00%

FAC Neutral: 0/9 = 100.00%

Numeric Index: 13/9 = 1.44

Remarks:
Sampling plot dominated by hydrophytic vegetation.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	= 18 *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- YES Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Wetland hydrology present within sampling plot.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	**Project No:** 140347	**Date:** 20-Aug-2002
Applicant/Owner: Yellowstone Mountain Club		**County:** Madison
Investigators: G. Howard		**State:** Montana
		Plot ID: 120

SOILS

Map Unit Name (Series and Phase): Garlet very channery sandy loam, 15-45 % slp.
Map Symbol: 46 **Drainage Class:** well drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-3	O	10YR2/1	N/A	N/A	N/A	Organics, Roots
3-4	A	10YR2/1	N/A	N/A	N/A	Mucky mineral
4-16	B	10YR3/1	N/A	N/A	N/A	Clay
18+	C	N6/	N/A	N/A	N/A	Clay

Hydric Soil Indicators:
- NO Histosol
- YES Histic Epipedon
- NO Sulfidic Odor
- YES Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:
Hydric soil indicators present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	**Is the Sampling Point within the Wetland?** (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Connection; (C1) wetland ends in upland & (C4) natural BB channel, impact; (I2) gully erosion & (I4) lots of sediment.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 6-Aug-2002	
Applicant/Owner: Yellowstone Mountain Club		County: Madison	
Investigators: B. Dutton		State: Montana	
		Plot ID: 131	

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: EM / FO
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		Just SE of WL 41.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Senecio triangularis	Herb	FACW+	*Calamagrostis canadensis*	Herb	FACW+
Groundsel,Arrow-Leaf			Reedgrass,Blue-Joint		
Fragaria virginiana	Herb	UPL	*Vaccinium scoparium*	Shrub	FACU-
Strawberry,Virginia			Grouseberry		
Carex aquatilis	Herb	OBL	*Juncus ensifolius*	Herb	FACW
Sedge,Water			Rush,Three-Stamen		
Trollius laxus	Herb	OBL	*Pedicularis contorta*	Herb	FACU+
Globeflower,American			Lousewort,Coiled		
Erigeron peregrinus	Herb	FACW	*Poa alpina*	Herb	FAC
Fleabane,Wandering			Bluegrass,Alpine		
Carex rostrata	Herb	OBL	*Zigadenus elegans*	Herb	FAC+
Sedge,Beaked			Deathcamas,Mountain		
Platanthera dilatata	Herb	FACW+	*Picea engelmannii*	Tree	FAC
Orchid,Leafy White			Spruce,Engelmann's		
Deschampsia cespitosa	Herb	FACW	*Abies lasiocarpa*	Tree	FACU
Hairgrass,Tufted			Fir,Subalpine		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 12/16 = 75.00%

FAC Neutral: 9/13 = 69.23%

Numeric Index: 41/16 = 2.56

Remarks:
Sampling plot dominated by hydrophytic vegetation.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	= 1 *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- YES Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Wetland hydrology present within sampling plot.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 6-Aug-2002
Applicant/Owner: Yellowstone Mountain Club		County: Madison
Investigators: B. Dutton		State: Montana
		Plot ID: 131

SOILS

Map Unit Name (Series and Phase): Garlet very channery sandy loam, 15-45 % slp.
Map Symbol: 46 Drainage Class: well drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-2	A	10YR2/1	N/A	N/A	N/A	Silty clay
2-14	B	10YR3/1	10YR4/6	Common	N/A	Silty clay

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- YES Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:
Hydric soil indicators present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Connection: (C1) wetland ends in upland, Impacts: (I1) no sediment deposition or gully erosion.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: G. Howard
Date: 28-Aug-2002
County: Madison
State: Montana
Plot ID: 166

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: EM / FO
Transect ID:
Field Location:

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Equisetum arvense	Herb	FAC	*Ribes lacustre*	Shrub	FAC+
Horsetail,Field			Currant,Prickly		
Senecio triangularis	Herb	FACW+	*Picea engelmannii*	Tree	FAC
Groundsel,Arrow-Leaf			Spruce,Engelmann's		
Carex neurophora	Herb	FACW	*Juncus ensifolius*	Herb	FACW
Sedge,Alpine-Nerve			Rush,Three-Stamen		
Calamagrostis canadensis	Herb	FACW+	*Epilobium ciliatum*	Herb	FACW-
Reedgrass,Blue-Joint			Willow-Herb,Hairy		
Trollius laxus	Herb	OBL			
Globeflower,American					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 9/9 = 100.00%
FAC Neutral: 9/9 = 100.00%
Numeric Index: 20/9 = 2.22

Remarks:
Sampling plot dominated by hydrophytic vegetation.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
N/A Stream, Lake or Tide Gauge
N/A Aerial Photographs
N/A Other
YES No Recorded Data

Field Observations
Depth of Surface Water: = 2 (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators
Primary Indicators
YES Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
NO Drainage Patterns in Wetlands
Secondary Indicators
NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:
Wetland hydrology present within sampling plot.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: G Howard
Date: 28-Aug-2002
County: Madison
State: Montana
Plot ID: 166

SOILS

Map Unit Name (Series and Phase): Shadow very channery loam, 15-45% slp.
Map Symbol: 121 Drainage Class: somewhat excessively drained
Mapped Hydric Inclusion?
Taxonomy (Subgroup): mixed Typic Cryochrepts
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-2	A	10YR2/1	N/A	N/A N/A	Loam
2-12+	B	10YR3/1	N/A	N/A N/A	Clay

Hydric Soil Indicators:
NO Histosol
NO Histic Epipedon
NO Sulfidic Odor
YES Aquic Moisture Regime
NO Reducing Conditions
YES Gleyed or Low Chroma Colors
NO Concretions
NO High Organic Content in Surface Layer in Sandy Soils
NO Organic Streaking in Sandy Soils
NO Listed on Local Hydric Soils List
NO Listed on National Hydric Soils List
NO Other (Explain in Remarks)

Remarks:
Hydric soil indicators present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No
Is the Sampling Point within the Wetland? (Yes) No

Remarks:
Connection; (C1) wetland ends in upland, impact; (I1) no sediment deposition or gully erosion.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Berglund, Pipp
Date: 12-Sep-2002
County: Madison
State: Montana
Plot ID: 181

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: Emergent
Transect ID: PM 181
Field Location: Immed. S of Harrys Water Rd (lower part)

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Carex neurophora	Herb	FACW	*Trollius laxus*	Herb	OBL
Sedge,Alpine-Nerve			Globeflower,American		
Equisetum arvense	Herb	FAC	*Senecio triangularis*	Herb	FACW+
Horsetail,Field			Groundsel,Arrow-Leaf		
Agrostis alba	Herb	FACW	*Carex phaeocephala*	Herb	FACU
Redtop			Sedge,Mountain Hare		
Calamagrostis canadensis	Herb	FACW+			
Reedgrass,Blue-Joint					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 6/7 = 85.71%
FAC Neutral: 5/6 = 83.33%
Numeric Index: 18/7 = 2.29

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: N/A (in.)
- Depth to Saturated Soil: = 0.0 (in.)

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Lower end of wetland terminates into a pond (fairly deep).

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain — Project No: 140347
Applicant/Owner: Yellowstone Mountain Club
Investigators: Berglund, Pipp
Date: 12-Sep-2002
County: Madison
State: Montana
Plot ID: 181

SOILS

Map Unit Name (Series and Phase): Gariel very channery sandy loam
Map Symbol: 46 Drainage Class: well drained — Mapped Hydric Inclusion?
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts — Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	A/B	N4/	N/A	N/A	N/A	Clay loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is the Sampling Point within the Wetland? (Yes) No

Remarks:
Connection: Ends at water road in a disturbance. Very likely it was historically connected to WPM #10 (downslope and across Harry's Water Road).
Disturbance: No direct impacts (except maybe Harry's Water Road); Upper portion contains actively stumping land.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 22-Aug-2002	
Applicant/Owner: Yellowstone Mountain Club		County: Madison	
Investigators: Traxler		State: Montana	
		Plot ID: BB358	

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: Emergent
Transect ID: BB 358
Field Location:
Betw Beginners Luck & WPM 77

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Senecio triangularis	Herb	FACW+	*Ribes lacustre*	Shrub	FAC+
Groundsel,Arrow-Leaf			Currant,Prickly		
Trollius laxus	Herb	OBL	*Picea engelmannii*	Tree	FAC
Globeflower,American			Spruce,Engelmann's		
Mertensia ciliata	Herb	FACW+	*Equisetum arvense*	Herb	FAC
Bluebells,Streamside			Horsetail,Field		
Calamagrostis canadensis	Herb	FACW+	*Epilobium ciliatum*	Herb	FACW-
Reedgrass,Blue-Joint			Willow-Herb,Hairy		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 8/8 = 100.00%
FAC Neutral: 5/5 = 100.00%
Numeric Index: 18/8 = 2.25

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A (In.)
Depth to Free Water in Pit:	N/A (In.)
Depth to Saturated Soil:	> 14.0 (In.)

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- NO Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- YES Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Pioneer Mountain	Project No: 140347	Date: 22-Aug-2002	
Applicant/Owner: Yellowstone Mountain Club		County: Madison	
Investigators: Traxler		State: Montana	
		Plot ID: BB358	

SOILS

Map Unit Name (Series and Phase): Garlet very channery sandy loam
Map Symbol: 46 Drainage Class: well drained
Taxonomy (Subgroup): Loamy-skeletal, mixed Typic Cryochrepts
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-2	O1	N/A	N/A	N/A	N/A	Loam
2-5	A/B	2.5YG/2	N/A	N/A	N/A	Silt
5-12	A/B	10YR2/1	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Connection: Downhill connection spills, connecting North into WPM 77 and connecting NE into 155. These all connect into the SFWF of the Gallatin River. Disturbance: no impacts.

WPM
13-10-11

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Yrnc - Pioneer mt. Date: 10/4/01
Applicant/Owner: Bellanstone mt club County: Madison
Investigator: [illegible] R Lecain J Berg and R Hart State: MT

Do Normal Circumstances exist on the site? Yes No
Is the site significantly disturbed (Atypical Situation)? Yes No
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.) *see summary

Community ID: Riverine
Transect ID: SP-9
Plot ID: WPM-13-10-11

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Juncus balticus	H	FACW+
2. Cala magrostis canad.	H	FACW+
3. Senecia triangularis	H	FACW+
4. Calamagrostis canad.	H	FACW+
5. Senecia triangularis	H	FACW+
6. Carex microptera	H	FAC
7. Veronica americana	H	OBL
8. Ribes lacustre	S	FAC+
9. Equisetum arvense	H	FAC
10. Abies lasiocarpa	T	FACU
11. Picea englemanii	T	FAC
12.		
13.		
14.		
15.		
16.		

WPM 10-11

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). >50%

Remarks: This is a single system with a connected hydrologic source.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available observations of soil pit

Field Observations:
Depth of Surface Water: — (in.)
Depth to Free Water in Pit: — (in.)
Depth to Saturated Soil: — (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated some surface H2O
X Saturated in Upper 12 Inches
X Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Some hydric source from B, added to upslope of culverts 10-11-12; the 10-11-12 culvert area is very wide (~100') and seeps are occurring on bare dirt slope suggesting a disturbed hydrology.

WPM 13-10-11

SOILS

Map Unit Name (Series and Phase): (46) garlet very channery loam Drainage Class: well drained

Field Observations

Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No —

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: (soil pit excavated) - FACW → OBL veg. define the WL boundary very well.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? Yes No assumed

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: There are 4 culverts in this system # (3, 10, 11, 12. The area of fill over culverts 10-11-12 was likely part of the wetland upslope. Water courses over a series of forested slumps down to wetlands adjacent to the SFk-TD.

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: YMC – Pioneer –	Date: 10/4/01
Applicant/Owner: Yellowstone Mt Club	County: Madison
Investigator: Vrana, Kloetzin, J. Berglund, R. Harris	State: MT
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? * Yes No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.) * summary	Community ID: Riverine Transect ID: SP-12 Plot ID: WPM-15, 16, 19,

wpm-16 is same system as wpm-15; not differentiated in field notebook
wetland pockets wD in W-16 =

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saxifraga arguta	H	FACW+	9. Carex utriculata	H	OBL
2. Senecio triangularis	H	FACW+	10.		
3. Petasites sagittata	H	FACW+	11.		
4. Juncus spp	H	FACW→	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). >50 %

Remarks: System of hydrophytic veg begins in upper reaches of WPM-15; veg. is patchy @ head waters as a result of disturbance under ski lift (upslope of culvert 15)

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other X No Recorded Data Available observations	Wetland Hydrology Indicators: Primary Indicators: X Inundated X Saturated in Upper 12 Inches X Water Marks X Drift Lines X Sediment Deposits X Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: no soil pit Depth of Surface Water: — (in.) Depth to Free Water ~~in Pit~~ flowing: <6" (in.) Depth to Saturated Soil: — (in.)	

Remarks: hydrology begins @ seep up in WPM-15, and likely charged throughout drainage. The flows were perennial from WPM 15 → just upslope of WPM-9 (culvert 9) – where it appears as though water sinks into tallus. B+B is continuous to SFK = JD;

WPM 15,16,19,9

SOILS

Map Unit Name (Series and Phase): (46) Garlet very channery loam Drainage Class: well drained

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No —

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: very well drained PACW → OBL veg boundary – no soil pit necessary

*See accompanying map for illustration of summary.

WETLAND DETERMINATION

WL directly below culvert 16 may have been partially fi

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes No assumed

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Large drainage that is interrupted by 4 culverts on mainstem and a confusing section with a constructed berm (in WPM-16) that diverts water back into the WPM-16 wetland pockets (on map – these wetland pockets are east of WPM-32). A large section of the stream below culvert 16 has been disturbed and flows ≥ 1,000 feet through dirt (ie: no streambed structure was left – flows through a "mixed-up" soil profile). This stream may have flowed into the arm of WPM-16 just north of WPM-18 & that arm of WPM-16 has been occluded by ski-slope fill and that stream course doesn't flow but has puddles of ground water in stream bed. From about the confluence of WPM-21 to the "berm" the streambed doesn't appear as if it ramied

Approved by HQUSACE 3/92

WPM-20 & 26

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ymc - Pioneer MT	Date: 10/4/01
Applicant/Owner: Yellowstone MT Club	County: madison
Investigator: [illegible] Rierain J Berglund R Hansen	State: MT
Do Normal Circumstances exist on the site? Yes (No)	Community ID: Riverine
Is the site significantly disturbed (Atypical Situation)? (Yes) No	Transect ID: SP-16
Is the area a potential Problem Area? Yes (No)	Plot ID: WPM-26 and WPM-20
(If needed, explain on reverse.)	

VEGETATION (same spp. in each WPM segment)

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Senecio triangularis	H	FACW+	9.		
2. Arnica chamissonis	H	FACW	10.		
3. Carex microptera	H	FAC	11.		
4. Juncus ensifolius	H	FACW	12.		
5. Bryophytes		(OBL)	13.		
6. Calamagrostis canadensis	H	FACW+	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). >50%

Remarks: WL veg begins at a seep head (WPM-26) and follows flow of H2O into a BSB; veg ends at WL vegetation slope disturbance. WPM-20 is a separated WL BSB to east of WPM 26-17 - same spp. and characteristics

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations: @ soil pit

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- X Water Marks
- X Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: The origin of hydrology is in headwaters of WPM-26; becomes intermittent below culvert 17 (dried up @ time of delineation). Hydrologic source for WPM-20 not as clear - prob. at head of WPM-20 (south end) - doesn't look like that was

WPM - 20 & 26

SOILS

Map Unit Name (Series and Phase): (46) garlet very channery loam Drainage Class: well

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No —

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: @ soil pit; boundary of hydrophytic veg very well defined

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes No assumed

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Disturbed area @ B & B and WL veg end @ ski slope disturbance. Topo map suggests this drainage crossed with the WPM-15-16 drainage. Questionable jurisdictional WL because of disturbance requires further analysis.

Approved by HQUSACE 3/92

* There are 2 culverts in the WPM 26-17 complex (#26; #1 there are no culverts in WPM-20. Both B & B's end at ski slope.

B-19

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

WPM-27

Project/Site: Yme - Pioneer MT
Applicant/Owner: Yellowstone Mt Club
Investigator: LBaer, R. Lorain, T Bernhardt, R Harris

Date: 10/4/01
County: Madison
State: MT

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? * Yes (No)
(If needed, explain on reverse.) * see summary

Community ID: Riverine
Transect ID: SP-17
Plot ID: WPM-27 and WPM-33

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Petasites sagittata	H	FACW+
2. Senecio triangularis	H	FACW+
3. Carex microptera	H	FAC
4. Arnica chamissonis	H	FACW
5. Geranium spp	H	FAC(+)
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). >50%

Remarks:

also - water is seeping out of ski slope to west of ditch - suggesting a buried source of hydrology ...?

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations: @ soil pit

Depth of Surface Water: _____ (in.)
Depth to Free Water in Pit: _____ (in.)
Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated
X Saturated in Upper 12 Inches
X Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Seep @ head of WPM-27, flows through culvert & 27 and into a man-made ditch over ski slope and down onto road where there is another culvert (missed at time of investigation) - water may have naturally flowed into WPM-33 area or upper reaches (southern segment) of WPM-4. WPM-33 channel comes from under road - it's seeping out from hill.

SOILS

WPM-27

Map Unit Name (Series and Phase): (46) garlet very channery loam
Drainage Class: well drained
Field Observations
Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: 8" soil pit excavated; wetland well defined by ~~DACW~~ veg until intercepts disturbance

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes No assumed

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Disturbed area - wpm-33 hydrology source is coming from under road fill; and wpm-27 water is coursing down the slope in a man-made ditch - do not know where this water should have gone - needs more investigation to sort out affect of road, ditching, and disturbance in logged area -

Approved by HQUSACE 3/92

Questionable jurisdictional status as a result of disturbance affect on potential historical connection to a jurisdictional wetland (wpm-4 complex).

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: YMC - Pioneer
Applicant/Owner: Yellowstone mt club
Investigator: [illegible] J Berglund R Harris

Date: 10/2/01 & 10/4/01
County: Madison
State: MT

Do Normal Circumstances exist on the site? Yes No
Is the site significantly disturbed (Atypical Situation)? * Yes No
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)
* see summary

Community ID: Riverine
Transect ID: SE-5
Plot ID: WPM-3 & 29

north + south segment

VEGETATION

WPM-3 → WPM-4 →

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saxifraga arguta	H	FACW+	9. Senecio triangularis	H	FACW+
2. (rocky)			10. Arnica chamissonis	H	FACW
3. Calamagrostis canadensis	H	FACW+	11. Carex utriculata	H	OBL
4. Saxifraga arguta	H	FACW+	12. Juncus ensifolius	H	FACW
5. Petasites sagittata	H	FACW+	13. Picea englemanii	T	FAC
6. Senecio triangularis	H	FACW+	14. Abies lasiocarpa	T	FACU
7. Calamagrostis canad.	H	FACW+	15. Calamagrostis canad.	H	FAC W+
8. Elymus triticoides	H	FAC	16. Equisetum arvense / Saxifraga arguta	H / H	FAC / FACW+

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). >50%

Remarks: system of hydrophytic veg starts below a rocky slump (below wpm-33) in wpm-4, wpm-29 also has a seep that is collected in 2 intermittent drainage

HYDROLOGY

__ Recorded Data (Describe in Remarks):
__ Stream, Lake, or Tide Gauge
__ Aerial Photographs
__ Other
X No Recorded Data Available observation

Field Observations: (no soil pit)

Depth of Surface Water: — (in.)
Depth to Free Water ~~in Pit~~ flowing: <6" (in.)
Depth to Saturated Soil: — (in.)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated
— Saturated in Upper 12 Inches water flowing
X Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
__ Oxidized Root Channels in Upper 12 Inches
__ Water-Stained Leaves
__ Local Soil Survey Data
__ FAC-Neutral Test
__ Other (Explain in Remarks)

Remarks: water was evident nearly all of northern segment of wpm-4 drainage / The southern segment of wpm-4 was dry, unsure if this segment connected w/ northern segment; there is an old logging yard btw the 2 areas and the hydrologic connection may have been affected. Requires more analysis.

SOILS

Map Unit Name (Series and Phase): (46) Carlet very channery loam Drainage Class: well drai

Taxonomy (Subgroup): Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: No soil pit excavated; clear FACW veg. bnd. clay and water evident in WL and associated drainage

WETLAND DETERMINATION

wpm 4-3-29 → connect to wpm-118b an -120 → SFK = Jurisdictional.

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes No assumed

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Perennial drainage that includes wpm-3 and wpm-4. wpm-29 is a bifurcated wetland drainage that begins out of a seep. The wpm-29 "drainages" are ~ 6" wide B&B, mostly vegetated with no waters below beginning seep (on Oct 4).

* There are 3 culverts in this drainage Approved by HQUSACE 3/92 and one large area of disturbance at the confluence of wpm-29 and wpm-4 (there are no culverts here - any wate will flow over disturbance and into wpm-4). Culverts 3, 28 are within the wpm-3;4 system.

Disturbance in upper reaches of wpm-4 may have had an af on continuity of wetland segments. Mostly now invegtate

WPM-39

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ymc - Pioneer mt
Applicant/Owner: Yellowstone mt club
Investigator: [illegible] RioCairT Berglund R Harris

Date: 10/3 and 5/01
County: madison
State: MT

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: Riverine
Transect ID: SP-19
Plot ID: wpm 55 [illegible] 39
36-34 [illegible] 39

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Equisetum arvense	H	FAC
2. Calamagrostis canad.	H	FACW+
3. Petasites sagittata	H	FACW+
4. Picea Englemanii	T	FAC
5. Rubus parviflorus	S	FACU+
6. Epilobium ciliatum	H	FACW
7. Sorbus sitchensis	H	FACW+
8. arnica chamissonis	H	FACW
9. Heracleum lanatum	H	FAC
10. Bryophytes	-	OBL
11. Juncus ens. Inlins.	H	FACW
12. Juncus drummondii	H	FACW
13. Ribes lacustre	S	FAC+
14. Abies lasiocarpa	T	FACU
15. Calamagrostis canad.	H	FACW+
16. Senecio triangularis	H	FACW+

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). > 50 %

Remarks: wpm-55 → culvert #40 - dominant Petasites; next of drainage is very similar - 39A is adjacent to culvert 39.

HYDROLOGY

Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available observation

Field Observations: & soil pit
Depth of Surface Water: - (in.)
Depth to Free Water in Pit: - (in.)
Depth to Saturated Soil: - (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
X Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Dry B & B wpm-55 → 40; beg is to pick up waters blw culvert 40 and 39 and flows perennially from there to SFK. The hydrology of 39A is unknown - a seep, or maybe from the wpm-49 area - UNKNOWN.

(121) Shadow v. channery loam somewhat excessively
SOILS (122) Shadow v. flaggy loam excessively well

Map Unit Name (Series and Phase): (46) garlet very channery loam Drainage Class: well drained
Field Observations
Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No —

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soil pit - FACW → obl veg clearly defines WL/ drainage boundary — no pit req.

X WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No assumed	Is this Sampling Point Within a Wetland? Yes No

Remarks: There are 7 culverts in this drainage — all flows to STK = JD.

Approved by HQUSACE 3/92

APPENDIX D

LAND & WATER

Appendix D

CONSTANCY DATA FOR EAST PIONEER MOUNTAIN VEGETATION

Yellowstone Club East Pioneer Mountain
Wetland Restoration and Mitigation Plan

LAND & WATER

Appendix D: *Constancy Data for East Pioneer Mountain Vegetation*

Scientific Name	Common Name	Constancy					
		Zone A	Zone B	Zone C	Zone D	Zone E	Zone F
Senecio triangularis	arrow-leaf groundsel	100	78	100	67	100	100
Calamagrostis canadensis	blue-joint reedgrass	100	33	78	100	67	
Arnica longifolia	seep-spring arnica		44	89		50	40
Abies lasiocarpa	sub-alpine fir	67	11	78	67	33	
Picea engelmannii	Engelmann's spruce	67	11	78	67	33	
Carex utriculata	beaked sedge			78	33	33	60
Equisetum arvense	field horsetail	67	11	78	33	33	
Juncus ensifolius	dagger-leaf rush		33	67		67	
Saxifraga arguta	brook saxifrage		22	67		50	40
Epilobium ciliatum	hairy willow-herb		22		33	50	60
Carex microptera	small-wing sedge	67	33	22		17	
Juncus drummondii	three-stamen rush		11			50	60
Ribes lacustre	swamp currant	67				50	40
Trollius laxus	American globeflower		22	11	100	17	
Carex aquatilis	water sedge					33	60
Erigeron peregrinus	wandering fleabane		22		67	17	
Alopecurus pratensis	meadow-foxtail					17	60
Juncus spp.	rush		11			17	40
Mertensia ciliata	streamside bluebells		44				
Thalictrum occidentale	western meadowrue			11	100		
Bromus ciliatus	fringed brome			11	67		
Heracleum lanatum	cow-parsnip				33	33	
Castilleja rhexifolia	rhexia-leaf Indian paintbrush		22				
Deschampsia cespitosa	tufted hairgrass		11			17	
Geranium spp.	geranium			22			
Phleum pratense	timothy		22				
Rubus parviflorus	thimbleberry					33	
Veronica americana	American speedwell	67					
Agrostis alba	redtop					17	
Angelica arguta	Lyall's angelica				33		
Carex neurophora	alpine nerve sedge				33		
Carex phaeocephala	mountain-hare sedge				33		
Fragaria virginiana	Virginia strawberry					17	
Geranium richardsonnii	white geranium				33		
Glyceria elata	tall manna grass				33		
Habenaria dilatata	leafy white orchid					17	
Juncus balticus	baltic rush	33					
Juncus mertensianus	Merten's rush		11				
Mitella pentandra	five-point bishop's-cap				33		
Pedicularis contorta	lousewort					17	
Poa alpina	alpine bluegrass					17	
Ranunculus eschscholtzii	Eschscholtz buttercup		11				
Rumex crispus	curly dock		11				
Zigadenus elegans	mountain death-camas					17	

APPENDIX E

LAND & WATER

Appendix E

MONTANA NOXIOUS WEED LIST

Yellowstone Club East Pioneer Mountain Wetland Restoration and Mitigation Plan

LAND & WATER

CATEGORY 1.
Category 1 noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria includes awareness and education, containment, and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.

1. Canada Thistle (*Cirsium arvense*)
2. Field Bindweed (*Convolvulus arvensis*)
3. Whitetop or Hoary Cress (*Cardaria draba*)
4. Leafy Spurge (*Euphorbia esula*)
5. Russian Knapweed (*Centaurea repens*)
6. Spotted Knapweed (*Centaurea maculosa*)
7. Diffuse Knapweed (*Centaurea diffusa*)
8. Dalmatian Toadflax (*Linaria dalmatica*)
9. St. John's Wort (*Hypericum perforatum*)
10. Sulfur (Erect) Cinquefoil (*Potentilla recta*)
11. Common Tansy (*Tanacetum vulgare*)
12. Ox-eye Daisy (*Chrysanthemum leucanthemum* L.)
13. Hound's-tongue (*Cynoglossum officinale* L.)

CATEGORY 2.
Category 2 noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria includes awareness and education, monitoring and containment of known infestations and eradication where possible.

1. Dyer's Woad (*Isatis tinctoria*)
2. Purple Loosestrife or Lythrum (*Lythrum salicaria, L. virgatum*, and any hybrid crosses thereof)
3. Tansy Ragwort (*Senecio jacobaea L.*)
4. Meadow Hawkweed Complex (*Hieracium pratense, H. floribundum, H. piloselloides*)
5. Orange Hawkweed (*Hieracium aurantiacum L.*)
6. Tall Buttercup (*Ranunculus acris L.*)
7. Tamarisk [Saltcedar] (*Tamarix spp.*)

CATEGORY 3.
Category 3 noxious weeds have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria includes awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.

1. Yellow Star-thistle (*Centaurea solstitialis*)
2. Common Crupina (*Crupina vulgaris*)
3. Rush Skeletonweed (*Chondrilla juncea*)

APPENDIX F

LAND & WATER

Appendix F

YMC Pioneer Mountain Progress Update Form

Yellowstone Club East Pioneer Mountain
Wetland Restoration and Mitigation Plan

LAND & WATER

YELLOWSTONE MOUNTAIN CLUB PIONEER MOUNTAIN PROGRESS UPDATE

Site:	**Zone:**
Activity Period:	Reported By:

Wells		Topography/Soil			Vegetation			Channel		
Well#	Monitoring Result	Work	Measurements	Other	Grass	Plugs	Other	Topography	Planting	other

NOTES: _____

_____

_____

Page ___ of ___

LAND & WATER